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ELEVEN NEW SPECIES OF FREE-LIVING MARINE NEMATODES OF THE GENUS *HALALAIMUS* DE MAN, 1888 (NEMATODA: ENOPLIDA) FROM FLORIDA WITH KEYS TO THE SPECIES

EDWIN J. KEPPNER
306 Hibiscus Avenue, Panama City Beach, Florida 32413

ABSTRACT. The genus *Halalaimus* is reviewed and divided into four groups based on characters of the male. Characters used to separate the groups of males include presence or absence of caudal alae and the presence or absence of a precloacal sensillum and/or pore. Ten new species are described from St. Andrew Bay, Bay County, Florida, and *H. gerlachi* n. sp. is proposed for *H. gracilis* sensu Gerlach, 1967. New species from St. Andrew Bay are *H. thalassinus, H. tarjani, H. bayensis, H. bulbocaudatus, H. variabilis, H. paracomatus, H. americanus, H. floridanus, H. brimi*, and *H. parafletcheri*. Keys to the species of each group are provided based on characters of the male. A key to the females of the genus is also provided.

Introduction

De Man (1888) erected the genus *Halalaimus* to accommodate a species of free-living marine nematode from the North Sea. The genus *Halalaimus* was differentiated from other genera on the basis of the extremely elongated and longitudinally orientated amphid. The head region of the type species, *Halalaimus gracilis* De Man, 1888, possessed three circles of sensilla. The first circle of sensilla contained six setae (inner labial sensilla), the second circle contained six setae (outer labial sensilla), and the third circle contained four setae (cephalic sensilla). The cuticle was thick and not transversely striated except for the caudal region of the male where there was a series of coarse transverse striations restricted to the lateral fields. A buccal cavity was absent. The esophagus was long and narrow anteriorly and broad posteriorly, and it followed the form of the anterior part of the body which tapers significantly from the esophago-intestinal junction to the attenuated anterior extremity.

Southern (1914) erected the genus *Nuada* for the species *Nuada leptosoma* Southern, 1914 from the coast of Ireland. The genus *Nuada* was characterized by a slender body, thick cuticle, thin-walled head region, four submedian cephalic setae (questioned by Southern, 1914), and the absence of amphids. *N. leptosoma* was represented by two specimens, a male and a female. The four submedian cephalic setae appeared to be present in one specimen and were absent from the other specimen.

Cobb (1920) erected the genus *Tycnodora* for a species of free-living marine nematode, *Tycnodora pachydermata* Cobb, 1920, from Key West, Florida. This species has a circle of outer labial sensilla and a circle of cephalic sensilla (6 + 4) in close proximity to one another, whereas the inner labial sensilla were absent or not observable.

Filipjev (1927) recognized the three genera, *Halalaimus* De Man, 1888; *Nuada* Southern, 1914; and *Tycnodora* Cobb, 1920; and described new species in each genus. He described *Nuada* as having two circles of sensilla close together in the head region and an amphid similar to that of *Halalaimus*. He stated reasons for considering *Nuada* and *Tycnodora* as subgenera of *Halalaimus* and suggested that *Halalaimus ponticus* Filipjev, 1922 represented a new subgenus of *Halalaimus* or a new genus.

Stekhoven (1935) placed *Nuada* in synonymy with the genus *Halalaimus*, and Allgen (1953) then placed *Nuada* as a subgenus of *Halalaimus*. Wieser (1953) summarized the information regarding the genus *Halalaimus*. He recognized two subgenera, *Halalaimus* s. str. and *Tycnodora* Cobb, 1920, and erected the third subgenus *Pachydora* Wieser, 1953 in which he placed *H. ponticus* and a new species, *Halalaimus climactericus* Wieser, 1953. He observed that the distinction between the subgenera *Halalaimus* and *Tycnodora* (distance between the anterior and posterior circles of anterior sensilla) is not absolute because transitional species were known. The distinguishing criterion was that the posterior circle of cephalic sensilla in *Tycnodora* was no farther posterior from the circle of outer labial sensilla than the outer labial sensilla were from the anterior end. In the subgenus *Halalaimus* s. str., the circle of cephalic sensilla was farther posterior from the circle of outer labial sensilla than the outer labial sensilla were from the anterior end. Wieser (1953) provided a key to the subgenera and the species within each subgenus. The key emphasized the location and length of the anterior circles of sensilla and the location and length of the amphid.

Mawson (1958) discussed the genus *Halalaimus*, described new species, and constructed a key to the species of the subgenera *Halalaimus* and *Tycnodora*. The keys emphasized the length and position of the anterior sensilla and the shape of the tail. Based on the specimens available to her, Mawson (1958) concluded that the length and position of the amphids was sufficiently variable to render impracticable the use of these characters in a key to the species.

Mawson (1958) also stated that the anterior circles of sensilla were not clear in a number of the specimens available to her, and she assumed that these sensilla were present in the usual numbers.

Timm (1961) described a number of new species of *Halalaimus*. Two of these new species, *Halalaimus setosus* and *Halalaimus filicollis* were described as having six cervical (cephalic) sensilla. Rao (1989) redescribed *H. setosus* and *H. filicollis* and confirmed the presence of six cervical (cephalic) sensilla in these species.

Vitiello (1970) described a number of new species of *Halalaimus* and discussed the characters used in differentiating the species in the genus. His collections yielded a large number of species of *Halalaimus*, but few specimens of each species. Vitiello (1970) expressed the opinion that the difficulty in identifying the species of *Halalaimus* was due to the rather subtle differences between species and the incompleteness of some of the previous descriptions. He observed that the transverse striations in the cuticle are best observed in the caudal region and the area of the posterior end of the amphid. He also observed, as did Mawson (1958), the variability in the position of the amphid in relation to the anterior end of the body and the variability in the length of the amphid. He also stated that the tail is easily broken, and that often it is difficult to determine whether the tail is complete or not. This variability and the subtle differences between species renders specific determination difficult. He also questioned the validity of the subgenus *Pachydora*.

Gerlach and Riemann (1974) placed the subgenus *Tycnodora* in synonymy with the subgenus *Nuada* and listed the species then known for the three subgenera. Riemann et al. (1970) discussed the morphology of the amphid in the genus *Halalaimus*. Juario (1974) erected a new subgenus, *Nualaimus*, for those species of the genus *Halalaimus* with a distinct circle of inner labial sensilla in addition to the circles of outer labial and cephalic sensilla.

Lorenzen (1981) did not accept the subgenera *Nuada* and *Pachydora*. He also did not recognize the subgenus *Nualaimus*. He placed *Nualaimus* in synonymy with *Halalaimus* because the type species of the genus *Halalaimus* and subgenus *Halalaimus* s. str., *Halalaimus gracilis* De Man, 1888, possessed a circle of inner labial sensilla as well as the outer labial and cephalic sensilla. Juario (1974) had not included *H. gracilis* in the subgenus *Nualaimus*. Therefore, the genus *Halalaimus* is not currently divided into subgenera. *Halalaimus* contains a rather large number of species, and there is a practical reason for subdividing the species into subgenera or groups to make identification easier during ecological studies. However, the traditional subgenera will not be used in this paper in accordance with Lorenzen (1981), nor will new subgenera be erected.

Platt and Warwick (1983) discussed the species of *Halalaimus* from the British Isles and provided figures of four species. They stated that "the cuticle of some species can be seen to be faintly striated (perhaps all species have striated cuticles but some are beyond the resolving power of the light microscope.)"

The purpose of this paper is to describe the specimens of the genus *Halalaimus* collected from Bay County, Florida and provide a key to the species of the genus *Halalaimus*. In addition, specimens of the genus were obtained from the Smithsonian Institution through the courtesy of Dr. W. Duane Hope and from Dr. Armen C. Tarjan of the University of Florida. Additional specimens were obtained from the U. S. Fish and Wildlife Service Field Office, Panama City, Florida. These specimens were collected as part of a sediment contaminant study of St. Andrew Bay, Florida.

Collections of free-living marine nematodes from estuarine and marine sediments from Bay County, Florida yielded a large number of species of *Halalaimus*, but each species is represented by very few specimens. This is similar to the reports by Mawson (1958) and Vitiello (1970). Many of the specimens examined during this study are not described herein because they were represented by a single specimen or juveniles that could not be associated with a described species.

Materials and Methods

Sediment samples were obtained from shallow water in St. Andrew Bay with corers of various diameters to a depth of 5-10 cm in the sediment. Sediment samples taken by the U. S. Fish and Wildlife Service from deep water in St. Andrew Bay, Bay County, Florida were obtained with a Ponar grab, and a core was taken from the surface of the grab sample. Sediment samples from the Gulf of Mexico were obtained with SCUBA equipment. Nematodes were removed from the sediments by repeated decantation prior to fixation in hot alcohol-formalin-acetic acid, or the entire sediment sample was fixed with 10% formalin in sea water prior to removal of the nematodes. Nematodes were mounted in anhydrous glycerol on Cobb slides. Measurements were made with a calibrated ocular micrometer or were obtained from drawings made with the aid of a drawing tube. Measurements are given in µm unless otherwise stated, and measurements are given as the mean of the population followed by the range of the population in parentheses. Observations were made with a Nikon Optiphot microscope with Nomarsky Differential Interference Contrast and a Wild M-20 microscope with an oil immersion objective with an N. A. of 1.30.

Only those specimens collected by the author or provided by Dr. Hope, Dr. Tarjan, or the U.S. Fish and Wildlife Service were examined directly. Otherwise, the work is based on descriptions of species provided in the literature.

RESULTS

The Nomarsky DIC optics made sensilla, lateral cuticular modifications, transverse cuticular striations, and cuticular vermiculations more easily observed. However, the same structures were adequately visible with bright field microscopy, and they probably would not be overlooked.

The body of the members of the genus *Halalaimus* is broadest near the midpoint, and the anterior end tapers greatly from the esophago-intestinal junction to the head. The tail of most species also tapers greatly from the anus to the tail tip. Specimens mounted with supports equal to the width at midbody often yielded specimens in which the head and tail ends were curved upward or downward. This often resulted in the long outer labial and cephalic sensilla following a tortuous course. Accurate measurements of their length was difficult to determine under these circumstances. If the anterior end was turned up or down, the distance of the amphid from the anterior end, the length of the amphid, and the distance between circles of outer labial and cephalic sensilla were difficult to determine accurately.

The anterior end has two or three circles of sensilla that are discernible with a light microscope (Fig. 1). The circle of inner labial sensilla may be present in all species, but may not be discernible with the light microscope when minute. When discernible, the inner labial sensilla vary from papilliform to setiform. When small and papilliform, they may be difficult to observe if the other sensilla obscure them. The circles of outer labial and cephalic sensilla may be close together or far apart, and the length of the sensilla in one circle may be different from that in the other circle. In some instances, it was obvious that the outer labial or cephalic sensilla were broken at the junction with the cuticle.

In general, the cuticle is thin from the anterior end to the level of the cephalic sensilla. The cuticle posterior to the cephalic sensilla is greatly thickened and remains so to the junction of the conical and cylindrical parts of the tail. Setiform cervical, somatic, and caudal sensilla are present in two species, and some species have small, widely spaced pits in the cuticle (Fig. 1). These pits are located sublaterally and begin just posterior to, or at the level of, the posterior end of the amphid and may extend the length of the body. A narrow duct penetrates the cuticle from the base of each pit.

The cuticle of the body may be smooth or have very fine transverse striations. As stated by others, these striations are often best observed at the posterior end of the amphid or in the anal region of the body. In a few species observed during this study, the striations appeared to become minute punctations in the midbody or precloacal region of the male or preanal region in the female.

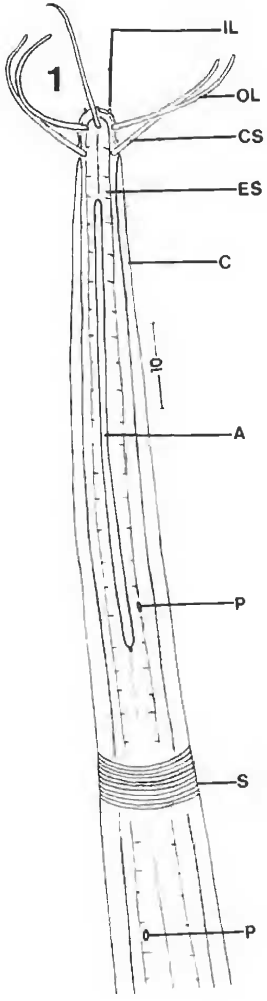
The cuticle of the conical part of the tail may be smooth or have fine transverse striations in both sexes. Males may have a prominent pattern of broad, elongate elaborations called vermiculations (Fig. 2) which have not been observed in females. These vermiculations appear to be internal and may be restricted to the ventral surface or may occur both ventrally and dorsally to the lateral line. The cylindrical part of the tail may have transverse striations that extend almost to the tail tip (Fig. 2). These striations are more prominent than the transverse striations of the body or conical part of the tail and are referred to as "coarse" striations.

The appearance of the lateral field on each side of the body in some species may be modified to present the appearance of alae (Fig. 2). Gerlach (1967) referred to this modification as "wings." The examination of this modification in whole mounts and coarse transverse sections cut with a razor blade did not reveal a distinct expansion of the cuticle that is characteristic of alae. This cuticular modification appears to be internal, and may not be an ala in the true sense of the term. However, until scanning and transmission electron microscope studies can be performed on this modification, the term ala will be used.

When present on the body, the somatic alae begin between the posterior end of the amphid and the nerve ring over each lateral line and extend the length of the body. When present on the conical part of the tail of females, the alae are extensions of the somatic alae and have no elaborations. The alae on the conical part of the male tail may be present in the absence of somatic alae. If they are present in the male, these lateral alae may have an elaborate scale-like pattern termed "ornamented" (Fig. 2). If the ornamentations are absent, the alae are referred to as "unornamented." When somatic and ornamented caudal alae are present in males, the somatic alae terminate just anterior to the beginning of the caudal alae (Fig. 2).

The tail in the species of *Halalaimus* examined during this study consists of a proximal conical part followed by a cylindrical part that can be filiform or relatively thick. The tail tip is pointed, blunt (expanded or not), or very narrow and divided into two (bifurcate) small terminal appendages (Fig. 3). Caudal glands were observed in the specimens examined. The spinneret was observable in those species with a blunt tail tip but was not observable in those with a bifurcate tail tip.

Males examined during this study may have a single, ventro-median, setiform, precloacal sensillum (Fig. 2); a single, ventro-median, precloacal pore; both the sensillum and the pore; or the sensillum and pore may be absent. When present, the pore has a duct that penetrates the cuticle and turns anteriorly in the body. These structures have been described in other species of the genus, and the presence or absence of these structures is valuable in differentiating species.



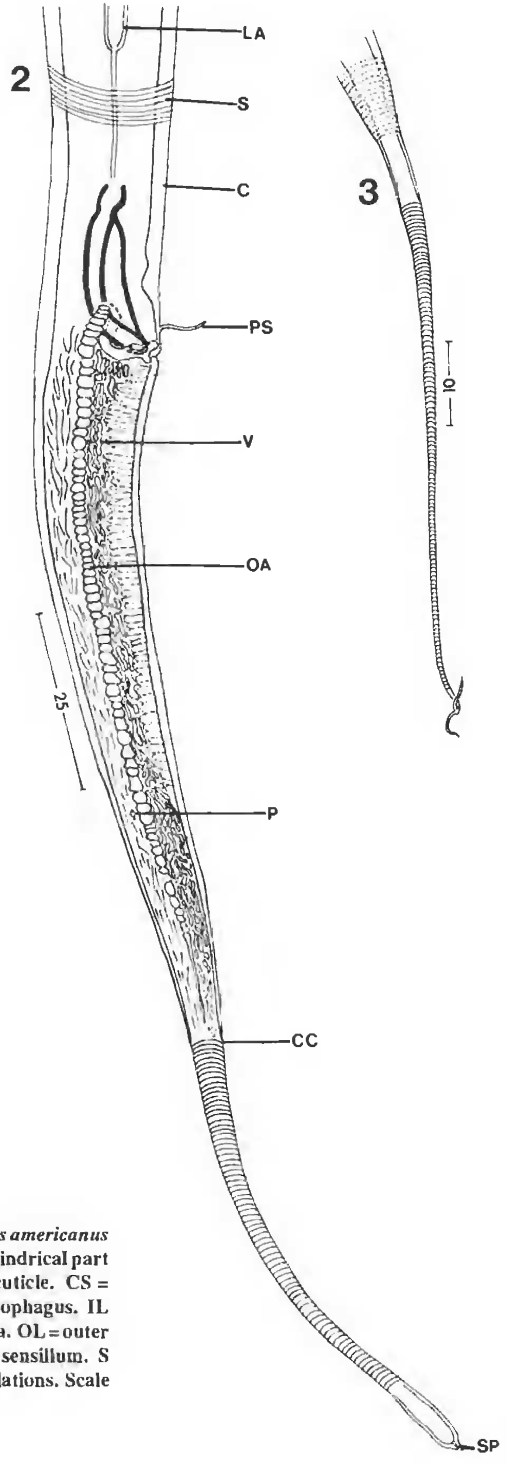


Fig. 1. *Halalaimus* sp., male, anterior end. Fig. 2. *Halalaimus americanus* n. sp., male, posterior end. Fig. 3. *Halalaimus brimi* n. sp., cylindrical part of male tail and tail tip. Abbreviations: A = amphid. C = cuticle. CS = cephalic sensillum. CC = coarse cuticular striations. ES = esophagus. IL = inner labial sensillum. LA = lateral ala. OA = ornamented ala. OL = outer labial sensillum. P = cuticular pit. PS = precloacal, setiform sensillum. S = transverse cuticular striations. SP = spinneret. V = vermiculations. Scale bars in µm.

Based on the observations made during this study, it appears that the males possess the best characters for differentiating species. The characters of the male emphasized herein are the shape of the tail tip (bifurcate or not), the pattern of cuticular striations on the tail, the presence or absence of somatic transverse cuticular striations, the presence or absence of caudal alae and their ornamentation, the presence or absence of a midventral precloacal sensillum and/or pore, the presence or absence of a pattern of vermiculations in the cuticle in the cloacal region, the shape of the spicules, and the shape and presence or absence of the gubernaculum. The distance of the amphids from the anterior end, the length of the amphid, the length of the outer labial and cephalic sensilla, and the ability to discern the circle of inner labial sensilla with a light microscope are also useful in identifying the species. The method of fixing the specimens did not appear to affect the ability to discern the somatic alae, ornamented or unornamented caudal alae, striations, or vermiculations. These characters were equally visible after formalin or alcohol-formalin-acetic acid fixation.

The characters of the female that appear most reliable are the presence or absence of coarse transverse striations on the cylindrical part of the tail, shape of the tail tip, the presence or absence of somatic transverse cuticular striations, the distance of the amphids from the anterior end, length of the amphids, the ability to discern the circle of inner labial sensilla with a light microscope, and length of the outer labial and cephalic sensilla.

The specimens of the species of *Halalaimus* examined were restricted to those mentioned previously. Comparisons with other species of the genus *Halalaimus* were based on the descriptions in the literature rather than actual examinations of type specimens. This requires that some assumptions be made. It was assumed that inner labial sensilla were not discernible, that transverse cuticular striations were absent, that the somatic and caudal alae were absent, and that a precloacal setiform sensillum and/or pore were absent unless they were mentioned in the description or shown on the figures of the species.

Generic Diagnosis - *Halalaimus* De Man, 1888

Enoplida, Oxystominidae, Type species: *Halalaimus gracilis* De Man, 1888. Amphid greatly elongated longitudinally. Anterior and posterior ends of body attenuated. Six inner labial sensilla present or absent (possibly present in all species but not discernible with a light microscope in some). Six outer labial sensilla and four or six (two species) cephalic sensilla present. Cuticle quite thick, abruptly reduced in thickness at level of cephalic sensilla, anus, and again at junction of conical and cylindrical parts of tail; transverse cuticular striations present or absent. Tail conical then cylindrical; tip blunt, or bifurcate. Cylindrical part of tail with or without transverse cuticular striations. Caudal glands present; spinneret present or undetermined. Species mostly marine and estuarine. Coomans and Jacobs (1983) discuss those species not found in estuarine and marine environments.

The specimens described and discussed herein are divided into groups based on male characters in order to provide some degree of organization and points of reference. A key to the males of the species in each group is given at the end of the account of the species in that group. A separate key to the females of all species is given at the end of the taxonomic section, because they are not as easily separated into groups as the males. Those species of the genus listed as *inquirenda* in Gerlach and Riemann, (1974) are not included in the following keys. A list of the species included in the following discussions and keys to the species of *Halalaimus* follows.

Known Species

Halalaimus alatus Timm, 1952
Halalaimus algeriensis Coomans and Jacobs, 1983
Halalaimus amphidellus Vitiello, 1970
Halalaimus amphistrius Vitiello, 1970
Halalaimus anne Sergeeva, 1972
Halalaimus brachyaulax Mawson, 1958
Halalaimus brevispiculum Sergeeva, 1973
Halalaimus capitulatus Boucher, 1977
Halalaimus caroliniensis Chitwood, 1936
Halalaimus ciliocaudatus Allgen, 1932
Halalaimis cirrhatus Gerlach, 1953
Halalaimus clinactericus Wieser, 1953
Halalaimus comatus Wieser, 1953
Halalaimus cubanus Andrassy, 1973
Halalaimus curvicaudatus Juario, 1974
Halalaimus delamarei Vitiello, 1970
Halalaimus diacros Mawson, 1958
Halalaimus diplocephalus Filipjev, 1927
Halalaimus filicollis Timm, 1961
Halalaimus filicorpus Vitiello, 1970
Halalaimus filum Gerlach, 1962
Halalaimus fletcheri Mawson, 1958
Halalaimus florescens Gerlach, 1967
Halalaimus gracilis De Man, 1888
Halalaimus horridus Gerlach, 1956
Halalaimus isaitshikovi Filipjev, 1927
Halalaimus jaltensis Sergeeva, 1973
Halalaimus leptoderma Platonova, 1971
Halalaimus leptosoma Southern, 1914
Halalaimus lineatoides Timm, 1961
Halalaimus lineatus Timm, 1961
Halalaimus longicaudatus Filipjev, 1927
Halalaimus longicollis Allgen, 1932
Halalaimus longisetosus Hopper, 1963

Halalaimus longistriatus Timm, 1961
Halalaimus lutarus Vitiello, 1970
Halalaimus luticolus Timm, 1961
Halalaimus macquariensis Mawson, 1958
Halalaimus marri Mawson, 1958
Halalaimus meyersi Wieser and Hopper, 1967
Halalaimus minisculus Tchesunov, 1978
Halalaimus monstrocaudatus Vitiello, 1970
Halalaimus nigrilapidarius Boucher, 1977
Halalaimus pachyderma Filipjev, 1927
Halalaimus pachydermatus Cobb, 1920
Halalaimus pachydoroides Vitiello, 1970
Halalaimus papillifer Gerlach, 1956
Halalaimus parvus Chitwood, 1936
Halalaimus ponticus Filipjev, 1922
Halalaimus rectispiculatus Platonova, 1971
Halalaimus relatus Gerlach, 1967
Halalaimus sarsi Gerlach, 1967
Halalaimus scleratus Timm, 1952
Halalaimus setosus Timm, 1961
Halalaimus similis Allgen, 1930
Halalaimus sobakini Sergeeva, 1973
Halalaimus stammeri Schneider, 1940
Halalaimus striatus Gerlach, 1956
Halalaimus supercirrhatus Gerlach, 1955
Halalaimus tenuicapitatus Filipjev, 1946
Halalaimus terrestris Gerlach, 1959
Halalaimus turbidus Vitiello, 1970
Halalaimus wodjanizkii Sergeeva, 1972
Halalaimus zenkevitshi Filipjev, 1927

New Species Described Herein.

Halalaimus thalassinus n. sp
Halalaimus tarjani n. sp.
Halalaimus bayensis n. sp.
Halalaimus bulbocaudatus n. sp.
Halalaimus variabilis n. sp.
Halalaimus paracomatus n. sp.
Halalaimus americanus n. sp
Halalaimus floridanus n. sp.
Halalaimus gerlachi n. sp.
Halalaimus brimi n. sp.
Halalaimus parafletcheri n. sp.

Artificial Key to the Groups of Males of the Genus *Halalaimus* De Man, 1888.

The male characters used to define the groups are the presence or absence of caudal alae and the presence or absence of a precloacal sensillum and/or precloacal pore. These characters are used in combination to distinguish four artificial groups in the following key:

1.	Caudal alae present	2
	Caudal alae absent	3
2(1).	Precloacal sensillum and/or pore present	Group 1
	Precloacal sensillum and/or pore absent	Group 2
3(1).	Precloacal sensillum and/or pore present	Group 3
	Precloacal sensillum and/or pore absent	Group 4

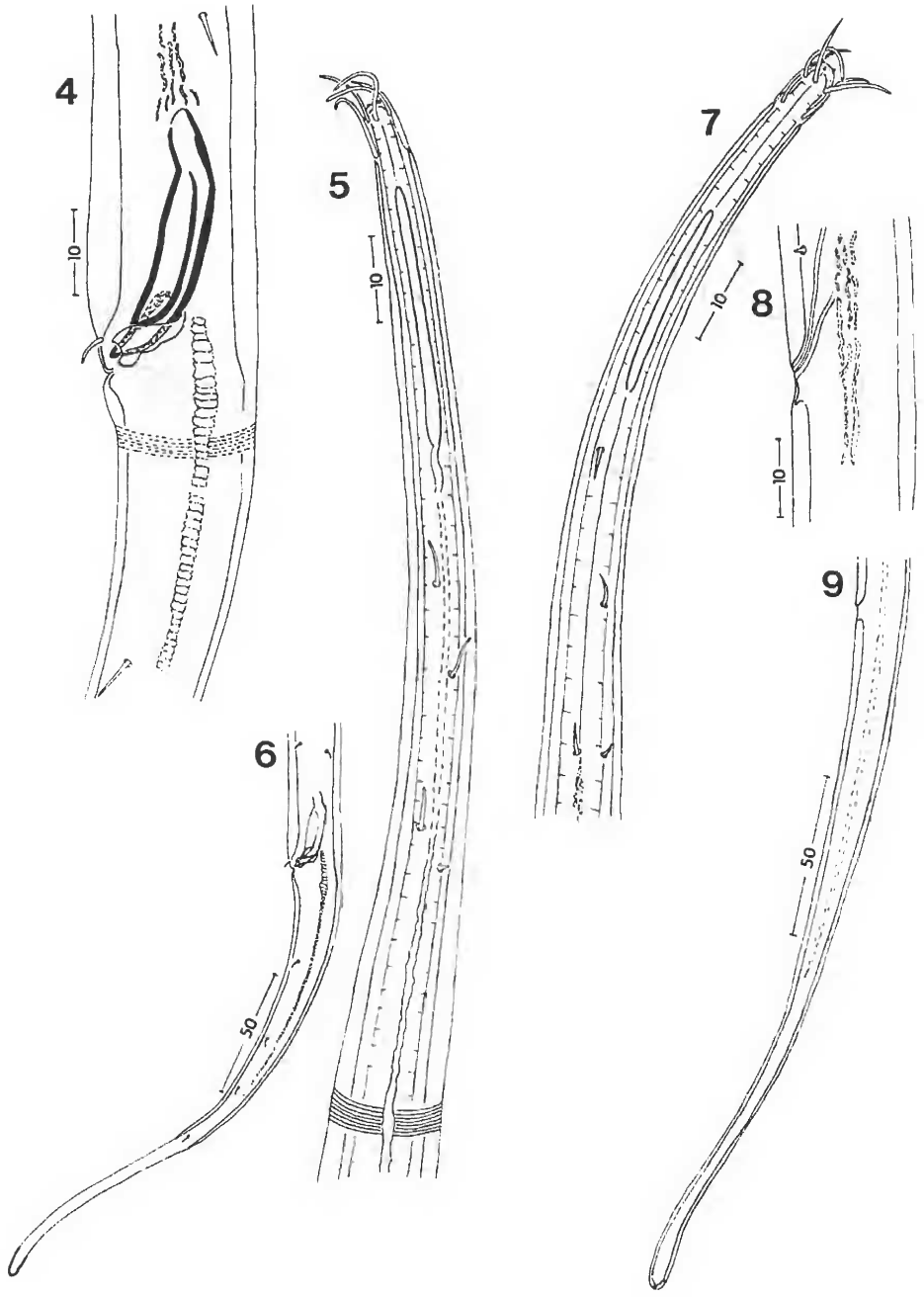
Group 1

Males of the species in this group have caudal alae, and a setiform precloacal sensillum and/or pore is present. The known species and those described as new herein have ornamented caudal alae. However, two male specimens of apparently different species were examined that had unornamented caudal alae, but they are not described here because each is represented by a single specimen. Distinctly visible circle of inner labial sensilla present or not discernible. Outer labial sensilla may be longer or shorter than cephalic sensilla, and the two circles are of varying distances apart. Species in this group all have a tail with blunt tip and visible spinneret.

Wieser (1953) described *Halalaimus comatus* on the basis of female specimens collected from the coast of Chile. Mawson (1958) described the male of *H. comatus* from the Antarctic. The male has ornamented caudal alae and a single, ventro-median, precloacal sensillum. *H. comatus* was unique in the presence of these characters. However, the collections from Florida waters yielded a number of additional species with these characters.

Halalaimus thalassinus n. sp.
Figs. 4-9

Cuticle with fine transverse striations. Lateral somatic alae present, begin just posterior to amphid, indistinct at



Figs. 4-9. *Halalaimus thalassinus* n. sp. Fig. 4. Male, cloacal region, left lateral view. Fig. 5. Male, anterior end, left lateral view. Fig. 6. Male, posterior end, left lateral view. Fig. 7. Female, anterior end, left lateral view. Fig. 8. Female, anal region, left lateral view. Fig. 9. Female, posterior end, left lateral view. Scale bars in μm.

first then more evident, vermiculated anteriorly, smooth over most of body, then vermiculated precloacally in male. Somatic alae terminate just anterior to the cloaca in male, ornamented caudal alae present. Somatic alae terminate postanally in female at junction of conical and cylindrical parts of tail, not vermiculated preanally, and caudal alae not ornamented. Setiform cervical sensilla present from just posterior to amphid to level of strongly defined lateral alae in males, become papilliform on remainder of body, then setiform precloacally and caudally. Setiform cervical sensilla present, somatic and caudal sensilla absent in females. Excretory pore not observed. Inner labial sensilla papilliform. Outer labial and cephalic sensilla equal in length, in two well-separated circles. Males with precloacal setiform sensillum present; pore absent. Cylindrical part of tail with fine transverse striations. Tail tip expanded, blunt; spinneret present.

Male (n = 1): Length 2.24 mm. Width at midbody 22. Head diameter 4.2 at level of cephalic sensilla. Outer labial and cephalic sensilla 11 long. Labial surface to amphid 22 and nerve ring 229. Amphid 23 long. Cervical and caudal sensilla 5 long. Esophagus 466 long. Tail 216 long. Width at cloaca 20. Spicules 30 long, alate. Gubernaculum 9.6 long; consists of a plate with keel-like extension between spicules and a cup-shaped part lateral to tip of each spicule. a = 101.8. b = 4.81. c = 10.4.

Female (n = 1): Length 2.21 mm. Width at midbody 27. Head diameter 4.8 at level of cephalic sensilla. Outer labial and cephalic sensilla 10 long. Labial surface to amphid 24 and nerve ring 240. Amphid 27 long. Cervical sensilla 5 long. Esophagus 473 long. Tail 213 long. Width at anus 16. Reproductive system amphidelphic; reflexed. Vulva 1.18 mm from anterior end. a = 81.9. b = 4.67. c = 10.4. V = 53%.

Specimens: Male holotype, USNM 77260; female allotype, USNM 77261.

Locality: St. Andrew Bay, Bay County, Florida (85° 42'43"W, 30° 08'33"N) at the National Marine Fisheries Service Laboratory, from a seagrass bed (*Thalassia testudinum*) about 1 meter deep.

Etymology: from the Greek *Thalass*, the sea.

Remarks: *Halalaimus thalassinus* n. sp. is unique among the species in Group 1 in the possession of cervical, somatic and caudal sensilla in the male and cervical sensilla in the female. The only other species in the genus *Halalaimus* with distinct cervical and caudal sensilla is *Halalaimus delamarei* Vitiello, 1970, which has been placed in Group 3. *H. delamarei* does not have caudal alae in the male, the cervical and caudal sensilla are very short, and inner labial sensilla are not discernible.

Halalaimus tarjani n. sp.
Figs. 10-19

Cuticle with fine transverse striations. Lateral somatic alae not observed. Ornamented caudal alae present in male, absent in female. Inner labial sensilla setiform. Outer labial and cephalic sensilla setiform and unequal in length; cephalic sensilla longer; circles well-separated. Excretory pore not observed. Lateral alae not observed. Males with precloacal sensillum, pore absent; ornamented caudal alae present. Tail conical then cylindrical. Cylindrical part of tail with coarse transverse striations. Tail tip clavate; spinneret present.

Males (n = 4): Length 1.09 mm (1.05-1.13). Width at midbody 22.7(22-24). Head diameter 5.1(4.4-5.3) at level of cephalic sensilla. Outer labial and/or cephalic sensilla were broken or missing on three males. One male with all sensilla present with outer labials 2.4 long, cephalic sensilla 4.0 long. Cephalic sensilla in holotype 4.8 long. Labial surface to amphid 8.6(7.8-9.6) and nerve ring 186(182-190). Amphid 38.8(38-40) long. Esophagus 371.8(353-378) long. Tail 159(154-165) long. Width at cloaca 19(19-19). Spicules 39(38-40) long, alate. Gubernaculum 10.0(9.6-11.0) long, consists of a plate with keel-like extension between spicules and cup-shaped extension lateral to each spicule tip. Vermiculations not observed on conical part of tail. a = 46.5(46.7-48.2). b = 2.93(2.88-3.00). c = 6.90(6.75-7.06).

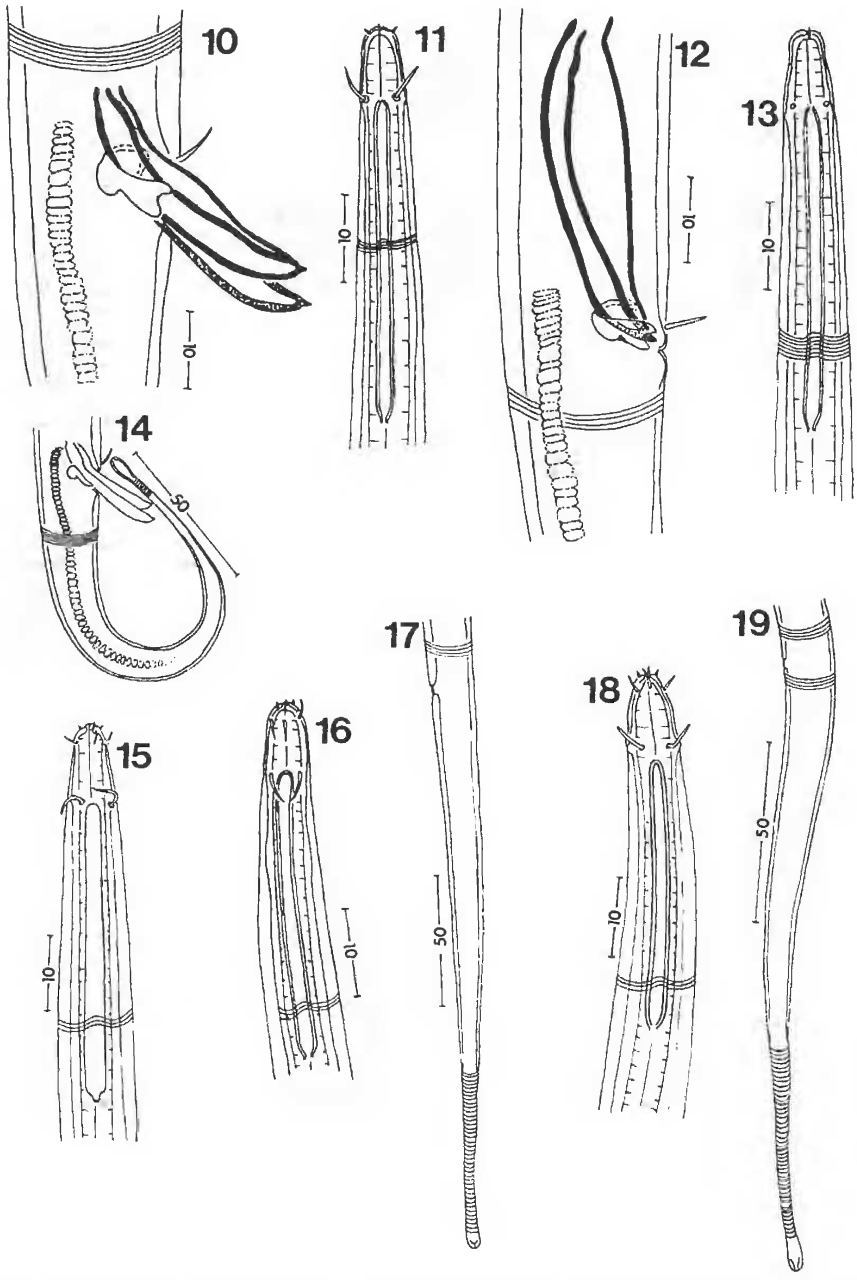
Females (n = 2): Length 1.06 mm (1.02-1.09). Width at midbody 33(29-37). Head diameter 6.4(6.4-6.4) at level of cephalic sensilla. Outer labial sensilla 2.1(2.1-2.1) long. Cephalic sensilla 4.3(4.3-4.3) long. Labial surface to amphid 10(10-10) and nerve ring 179(178-180). Amphid 32(32-32) long. Esophagus 346.5(321-372) long. Tail 176.5(171-182) long. Width at anus 15(14-16). Reproductive system amphidelphic; reflexed. Vulva 589(567-611) from anterior end. a = 32.4(29.5-35.2). b = 3.06(2.93-3.18). c = 5.98(5.96-6.00). V = 56%(56-56).

Specimens: Holotype male, USNM 77262; three paratype males, USNM 77263-77265; allotype female, USNM 77497; paratype female USNM 77499.

Locality: St. Andrew Bay, Bay County, Florida (85° 39'46"W, 30° 08'34"N) water 13 meters deep, (85° 38'52"W, 30° 07'38"N) water 7.5 meters deep, and (85° 39'46"W, 30° 08'40"N) water 12.2 meters deep.

Etymology: Named for Dr. Armen C. Tarjan, University of Florida.

Remarks: *Halalaimus tarjani* n. sp. belongs with those species in Group 1 that have discernible inner labial sensilla, ornamented caudal alae, and the cylindrical part of tail has coarse striations. *H. tarjani* n. sp. differs from the only other species with these characters, *Halalaimus bayensis* n. sp. (to be described next), in that the outer labial and cephalic sensilla are much shorter and unequal in length (0.29-0.33 & 0.78-0.92 versus 2.8-3.0 head diameters), the amphid begins much closer to the anterior end (1.7 versus 5.3-6.0 head diameters), the spicules are longer (2.0-2.1



Figs. 10-19. *Halalaimus tarjani* n. sp. Fig. 10. Male, cloacal region, right lateral view. Fig. 11. Male, anterior end, right lateral view. Fig. 12. Male, cloacal region, right lateral view. Fig. 13. Male, anterior end, right lateral view. Fig. 14. Male, posterior end, right lateral view. Fig. 15. Male, anterior end, left lateral view. Fig. 16. Female, anterior end, left lateral view. Fig. 17. Female, posterior end, left lateral view. Fig. 18. Female, anterior end, left lateral view. Fig. 19. Female, posterior end, left lateral view. Scale bars in µm.

versus 1.7 cloacal diameters), and the gubernaculum is of a different shape.

H. tarjani n. sp. is also similar to those species of the genus *Halalaimus* with a broad amphid. Wieser (1953) placed those species with a broad amphid (40% of corresponding body diameter at midlength of the amphid) in the subgenus *Pachydora*. This subgenus contained two species, *Halalaimus* (*Pachydora*) *ponticus* Filipjev, 1922 and *Halalaimus* (*Pachydora*) *climactericus* Wieser, 1953. Vitiello (1970) described *Halalaimus pachydoroides* and discussed the relationship between amphid width and corresponding body diameter and demonstrated that the relationship decreases from the anterior to posterior end of the amphid in *H. pachydoroides* and *H. ponticus*.

H. tarjani n. sp. also demonstrates this relationship. The amphid is 29.8%(27-32) of the corresponding body diameter anteriorly and 24%(20-27) posteriorly. *H. tarjani* n. sp. females differ from *H. climactericus* females (male unknown) in the presence of coarse transverse striations on the cylindrical part of the tail, presence of discernible inner labial sensilla, and in the longer outer labial and cephalic sensilla (2.1 & 4.3 versus 1.0 and 2.0). *H. tarjani* n. sp. differs from *H. pachydoroides* (Group 4) in the presence of discernible inner labial sensilla, shape of the tail (cylindrical part short, blunt versus cylindrical part long, flagellate), in the greater distance between circles of outer labial and cephalic sensilla (1.1-1.2 versus 0.4 head diameters), and in the shorter length of the tail (males "c" = 6.75-7.06, females "c" = 5.96-6.00 versus males "c" = 4.7-5.0, females "c" = 4.9-6.1). *H. tarjani* n. sp. differs from *H. ponticus* in the presence of a discernible circle of inner labial sensilla, and in the presence of ornamented caudal alae in the male.

Halalaimus bayensis n. sp.
Figs. 20-27

Cuticle with fine transverse striations, appear punctate at midbody. Cuticular pits present. Lateral alae not observed. Ornamented caudal alae restricted to conical part of male tail; absent in female. Cuticle in male cloacal region faintly vermiculated on ventral surface in holotype, more distinct in paratype. Inner labial sensilla papilliform. Outer labial and cephalic sensilla equal in length within and between circles; in two well-separated circles. Excretory pore not observed. Males with setiform precloacal sensillum; pore absent. Cylindrical part of tail with coarse transverse striations. Tail tip blunt; spinneret present.

Males (n = 2): Length 1.24 mm (1.19-1.28). Width at midbody 20(19-21). Head diameter 3.6(3.6-3.6) at level of cephalic sensilla. Outer labial and cephalic sensilla 11.5(11-12) long. Labial surface to amphid 23.5(23-24) and nerve ring 184(182-186). Amphid 48(46-50) long. Esophagus 302(296-308) long. Tail 190.5(189-192) long. Width at cloaca 14(14-14). Spicules 24(24-24) long, alate. Gubernaculum 8(8-8) long, consists of plate with keel-like extension between spicules and cup-shaped extension lateral to each spicule tip. a = 62.1(56.7-67.4). b = 4.09(4.02-4.16). c = 6.49(6.30-6.67).

Juvenile female (n = 1): Length 1.10 mm. Width at midbody 16. Head diameter 3.6 at level of cephalic sensilla. Outer labial and cephalic sensilla 11 long. Labial surface to amphid 37 and nerve ring 158. Amphid 37 long. Esophagus 265 long. Tail 160 long. Width at anus 11. Reproductive system amphidelphic; reflexed. Anterior end to vulva 536. a = 68.8. b = 4.15. c = 6.88. V = 49%.

Specimens: Holotype male, USNM 77498; allotype female, USNM 77500.

Locality: St. Andrew Bay, Bay County, Florida (85° 39'46"W, 30° 08'40"N and 85° 36'43"W, 30° 06'52"N). Water 9.5 and 12.2 meters deep.

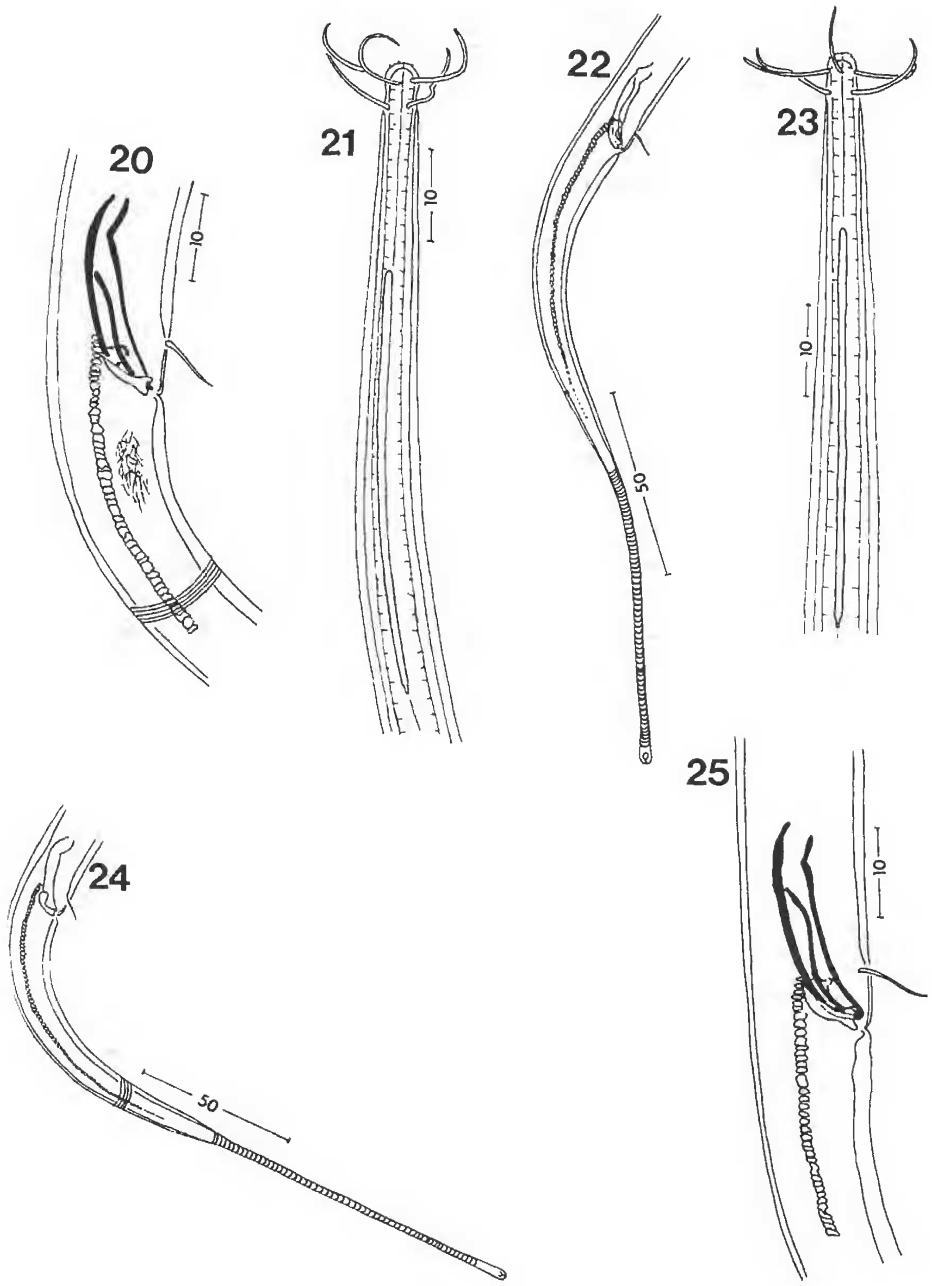
Etymology: Named for the geographic locality, Bay County, Florida.

Remarks: *Halalaimus bayensis* n. sp. belongs with those species in Group 1 that have a discernible circle of inner labial sensilla, ornamented caudal alae, and the cylindrical part of the tail has coarse transverse striations. *H. bayensis* n. sp. differs from *H. tarjani* n. sp. as described under the remarks section for *H. tarjani* n. sp. *H. bayensis* n. sp. males are also similar to males of *H. variabilis* n. sp. and *H. floridanus* n. sp. (both described below). *H. bayensis* n. sp. differs from *H. variabilis* n. sp. in the presence of a precloacal setiform sensillum, the absence of a precloacal pore, and the presence of discernible inner labial sensilla. *H. bayensis* n. sp. differs from *H. floridanus* n. sp. in the shorter outer labial and cephalic sensilla (2.8-3.0 versus 4.4-4.5 head diameters long), distance from the labial surface to the amphid (5.3-6.0 versus 2.9-3.1 head diameters), length of the tail (13.5-13.7 versus 7.5-9.4 cloacal diameters long), "a" value (56.0-67.4 versus 78.0-89.5), and the presence of discernible inner labial sensilla.

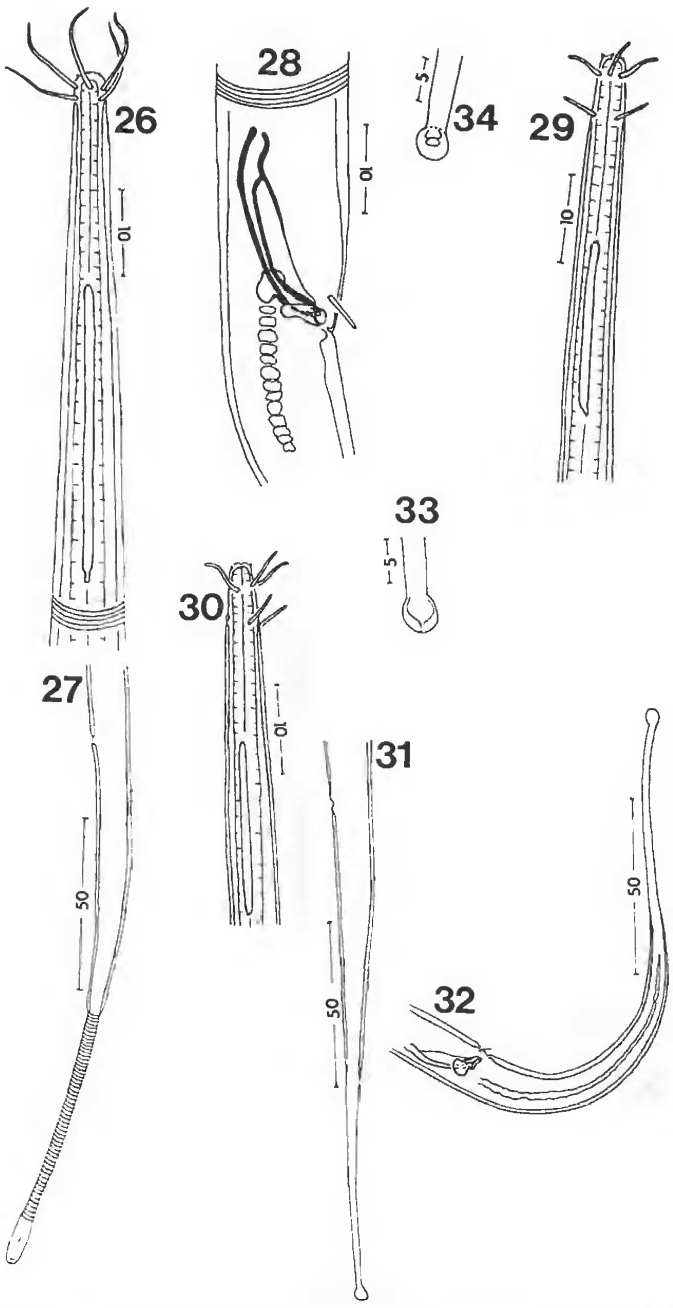
Halalaimus bulbocaudatus n. sp.
Figs. 28-34

Cuticle with faint transverse striations, best observed in precloacal region in male. Lateral somatic alae not observed. Ornamented caudal alae present in male, absent in female. Inner labial sensilla papilliform. Outer labial and cephalic sensilla equal in length, circles well-separated. Amphid relatively short, situated well posterior to cephalic sensilla. Excretory pore not observed. Male with precloacal sensillum; pore absent. Cylindrical part of tail without coarse transverse striations. Tail tip in both sexes with nearly spherical swelling at tip; spinneret present.

Male (n = 1): Length 1.16 mm. Width at midbody 20. Head diameter 3.8 at level of cephalic sensilla. Outer labial and cephalic sensilla 4.2 long. Labial surface to amphid 21



Figs. 20-25. ***Halalaimus bayensis*** **n. sp. Fig. 20. Male, cloacal region, right lateral view. Fig. 21. Male, anterior end, right lateral view. Fig. 22. Male, posterior end, right lateral view. Fig. 23. Male, anterior end, right lateral view. Fig. 24. Male, posterior end, right lateral view. Fig. 25. Male, cloacal region, right lateral view. Scale bars in µm.**



Figs. 26-27. *Halalaimus bayensis* n. sp. Fig. 26. Juvenile female, anterior end, left lateral view. Fig. 27. Juvenile female, posterior end, left lateral view. Figs. 28-34. *Halalaimus bulbocaudatus* n. sp. Fig. 28. Male, cloacal region, right lateral view. Fig. 29. Male, anterior end, left lateral view. Fig. 30. Female, anterior end, left lateral view. Fig. 31. Female, posterior end, left lateral view. Fig. 32. Male, posterior end, right lateral view. Fig. 33. Female, tail tip. Fig. 34. Male, tail tip. Scale bars in µm.

and nerve ring 200. Amphid 19 long. Esophagus 334 long. Tail 155 long. Width at cloaca 14. Spicules 23 long. Gubernaculum 8 long, consists of a plate with keel-like extension between spicules and extension lateral to each spicule tip. Postcloacal cuticular vermiculations absent. a = 58.0. b = 3.47. c = 7.84.

Female (n = 1): Length 1.05 mm. Width at midbody 20. Head diameter 3.8 at level of cephalic sensilla. Outer labial and cephalic sensilla 4.2 long. Labial surface to amphid 20 and nerve ring 184. Amphid 19 long. Esophagus 315 long. Tail 152 long. Width at anus 13. Reproductive system amphidelphic; reflexed. Anterior end to vulva 580. a = 50.0. b = 3.33. c = 6.91. V = 55%.

Specimens: Holotype male, USNM 77266; allotype female, USNM 77267.

Locality: St. Andrew Bay, Bay County, Florida (85° 38'19"W, 30° 07'44"N). Water 12.2 meters deep.

Etymology: from Latin *bulbo* meaning "a bulb" and Latin *caudatus* meaning "having a tail."

Remarks: *Halalaimus bulbocaudatus* n. sp. belongs with those species in Group 1 that have ornamented caudal alae, coarse transverse striations are absent from the cylindrical part of the tail, and the inner labial sensilla are discernible. *H. bulbocaudatus* n. sp. differs from *H. thalassinus* n. sp. in the absence of setiform cervical and caudal sensilla, the presence of a spherical swelling at the tail tip, and the outer labial and cephalic sensilla are shorter (1.1 versus 2.2 head diameters).

A spherical swelling at the tail tip is also present in *Halalaimus similis* Allgen, 1930 (only the female is known), and the same was also described for this species by Bresslau and Stekhoven (1940). Wieser (1953) described *Halalaimus comatus* with a knob-like swelling at the tail tip. Mawson (1958) described the tail tip in specimens of *H. comatus* as swollen in the female and as a distinct spherical swelling in the male similar to that described for *H. similis*.

H. bulbocaudatus n. sp. is similar to *H. comatus* in the presence of ornamented caudal alae and a precloacal setiform sensillum in the male and in the absence of coarse transverse striations on the cylindrical part of the tail in both sexes. *H. bulbocaudatus* n. sp. differs from *H. comatus* in the presence of a discernible circle of inner labial sensilla and the greater distance between the circles of outer labial and cephalic sensilla (1.0 head diameter versus 0.23 head diameter). *H. bulbocaudatus* n. sp. females differ from *H. similis* females (males unknown) in the presence of a discernible circle of inner labial sensilla.

Halalaimus variabilis n. sp.
Figs. 35-43

Cuticle with fine transverse striations, appear punctate in midbody region, gradually become vermiculations anterior to cloaca in male; not present in female. Lateral alae not observed. Ornamented caudal alae present in male, absent in female. Cuticular pits present for length of body. Inner labial sensilla not discernible. Outer labial and cephalic sensilla equal in length, in two well-separated circles. Excretory pore not observed. Conical part of tail with vermiculations on ventral surface in male, absent in female. Precloacal sensillum absent, precloacal pore present. Cylindrical part of tail with coarse transverse striations in both sexes. Tail tip narrow, blunt; spinneret present.

Males (n = 2): Length 1.85 mm (1.72-1.97). Width at midbody 22.5(21-24). Head diameter 5.1(4.8-5.4) at level of cephalic sensilla. Outer labial and cephalic sensilla 17(15-19) long. Labial surface to amphid 18.5(16-21) and nerve ring 208(200-216). Amphid 53(38-68) long. Esophagus 381.5(353-410) long. Tail 203(198-208) long. Width at cloaca 16.5(16-17). Spicules 20.5(19-22) long. Gubernaculum 9.8(9.6-10.0) long, consists of a plate with a keel-like extension between spicules, and an extension lateral to each spicule tip; distal end cup-shaped. a = 82.0(81.9-82.1). b = 4.84(4.80-4.87). c = 9.11(8.27-9.95).

Females (n = 2): Length 1.81 mm (1.58-2.03). Width at midbody 26.5(26-27). Head diameter 5.1(4.8-5.4) at level of cephalic sensilla. Outer labial and cephalic sensilla 17.5(17-18) long. Labial surface to amphid 18.5(16-21) and nerve ring 201(194-208). Amphid 53(46-60)long. Esophagus 365.5(321-410) long. Tail 217.5(213-222) long. Width at anus 15(15-15). Reproductive system amphidelphic, reflexed. Vulva 919.5(844-995) from anterior end. a = 68.3(58.5-78.1). b = 4.94(4.92-4.95). c = 10.5(9.5-11.4). V = 51%(49-53).

Specimens: Male holotype, USNM 77503; male paratype, USNM 77504; female allotype, USNM 77544.

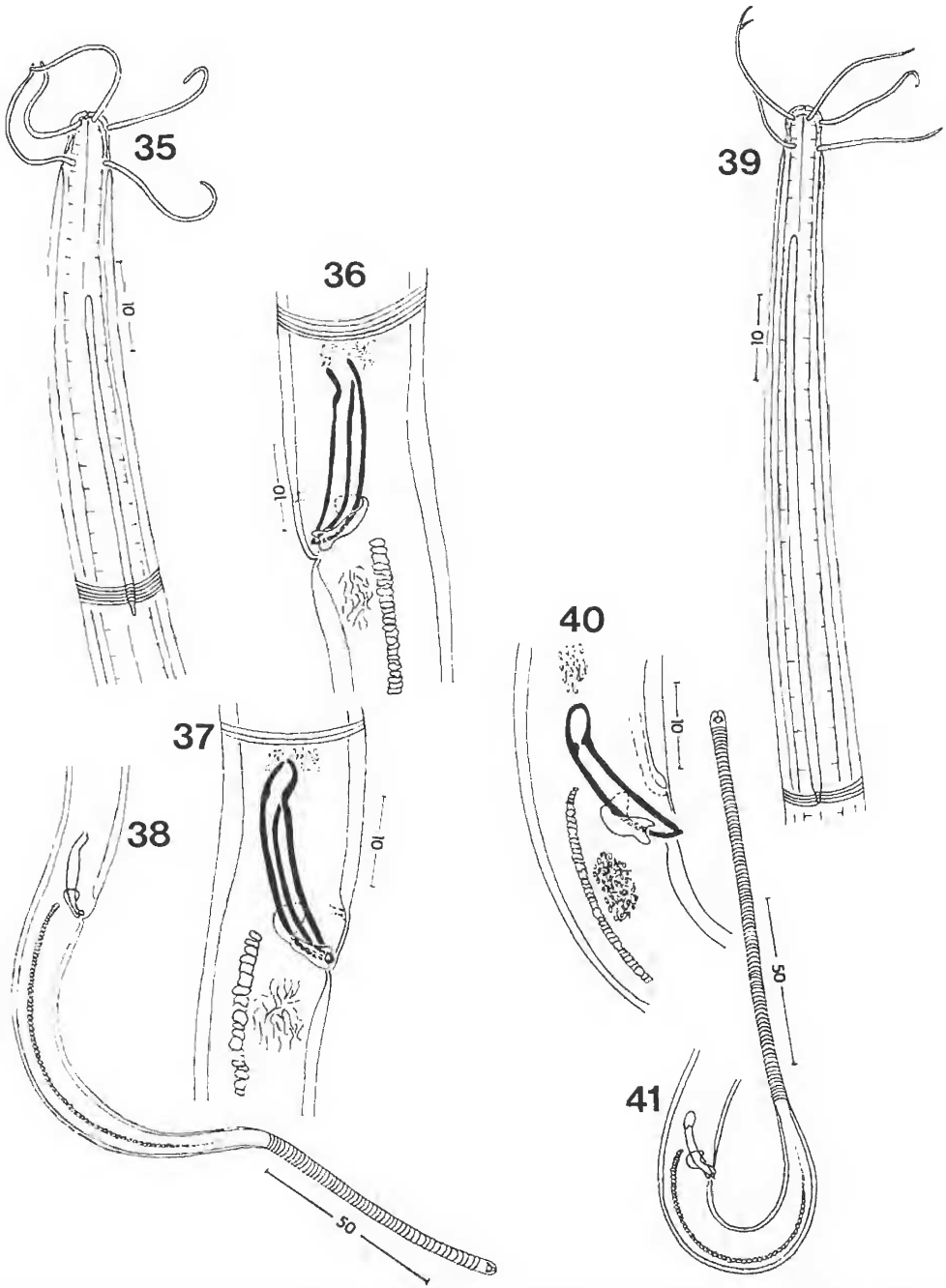
Locality: Mouth of Freshwater Bayou off St. Andrew Bay, Bay County, Florida (85° 39'00"W, 30° 07'30"N). Water 2.1 meters deep.

Etymology: From Latin *variabilis* meaning "to vary."

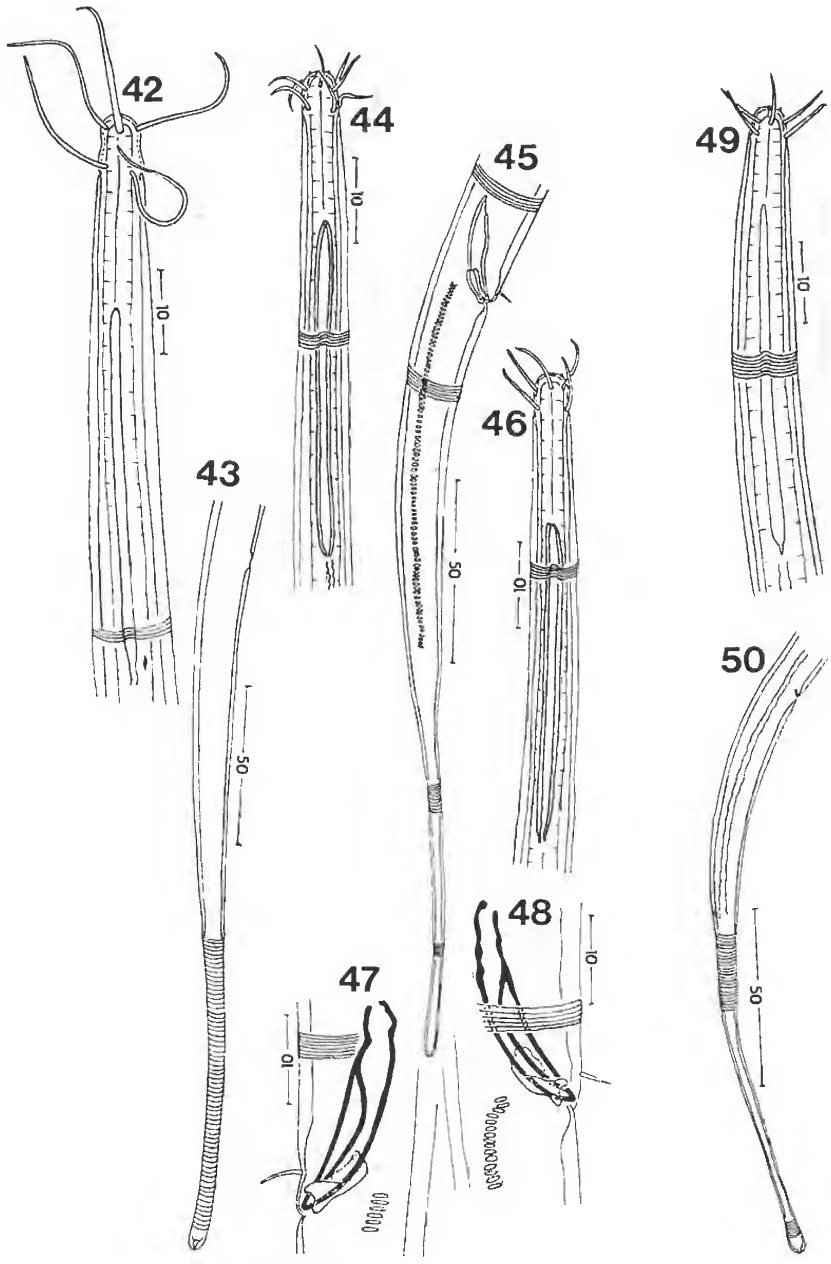
Remarks: *Halalaimus variabilis* n. sp. is the only species in Group 1 in which the males have ornamented caudal alae, a precloacal pore is present, a precloacal sensillum is absent, and inner labial sensilla are not discernible.

Halalaimus paracomatus n. sp.
Figs. 44-50

Cuticle with transverse striations, most evident posterior to nerve ring. Lateral alae present. Ornamented caudal alae present in male, unornamented caudal alae present in female. Inner labial sensilla papilliform. Outer labial and cephalic sensilla equal, in two circles close together. Male with setiform precloacal sensillum; precloacal pore absent. Excretory pore not observed. Conical part of tail without vermiculations in both sexes. Cylindrical part of tail with coarse transverse striations. Tail tip blunt, slightly bul-



Figs. 35-41. *Halalaimus variabilis* n. sp. Fig. 35. Male, anterior end, left lateral view. Fig. 36. Male number 1, cloacal region, left lateral view. Fig. 37. Male number 1, cloacal region, right lateral view. Fig. 38. Male number 3, posterior end, right lateral view. Fig. 39. Male, anterior end, right lateral view. Fig. 40. Male, cloacal region, right lateral view. Fig. 41. Male, posterior end, right lateral view. Scale bars in µm.



Figs. 42-43. *Halalaimus variabilis* n. sp. Fig. 42. Female, anterior end, right lateral view. Fig. 43. Female, posterior end, right lateral view. Figs. 44-50. *Halalaimus paracomatus* n. sp. Fig. 44. Male, anterior end, right lateral view. Fig. 45. Male, posterior end, right lateral view. Fig. 46. Male, anterior end, left lateral view. Fig. 47. Male, cloacal region, left lateral view. Fig. 48. Male, cloacal region, right lateral view. Fig. 49. Female, anterior end, right lateral view. Fig. 50. Female, posterior end, right lateral view. Scale bars in µm.

bous; spinneret present.

Males (n = 2): Length 1.41 mm (1.40-1.42). Width at midbody 24.5(24-25). Head diameter 4.2(4.2-4.2) at level of cephalic sensilla. Outer labial and cephalic sensilla 6.1(5.5-6.6) long. Labial surface to amphid 16.5(16-17) and nerve ring 252.5(251-254). Amphid 38(37-39) long. Esophagus 450.5(447-454) long. Tail 192(186-198) long. Width at cloaca 15.5(15-16). Spicules 24.5(24-25) long. Gubernaculum 9.5(9-10) long, consists of a plate with an extension lateral to each spicule tip; distal end cup-shaped; keel-like extension weakly developed. a = 57.6(56.8-58.3). b = 3.13(3.13-3.13). c = 7.35(7.07-7.63).

Female (n = 1): Length 1.36 mm. Width at midbody 24. Head diameter 4.8 at level of cephalic sensilla. Outer labial and cephalic sensilla 6.4 long. Labial surface to amphid 13 and nerve ring 264. Amphid 44 long. Esophagus 473 long. Tail 181 long. Width at anus 11. Reproductive system amphidelphic; reflexed. Vulva 762 from anterior end. a = 56.7. b = 2.88. c = 7.51. V = 56%.

Specimens: Male holotype, USNM 77268; male paratype, USNM 77269.

Locality: St. Andrew Bay, Bay County, Florida (85° 40'59"W, 30° 08'23"N) and (85° 38'52"W, 30° 07'38"N). Water 7 meters and 11.1 meters deep.

Etymology: from Latin **para** meaning "near or beside" and *comatus* specific epithet for *Halalaimus comatus* Wieser, 1953.

Remarks: *Halalaimus paracomatus* n. sp. is very similar to *Halalaimus comatus* Wieser, 1953. *H. paracomatus* n. sp. differs from *H. comatus* in that the cylindrical part of the tail has coarse transverse striations, the tail tip does not have a spherical swelling, outer labial and cephalic sensilla are about equal in length, and the amphid is longer (5.3-8.8 versus 3.5 head diameters). *H. paracomatus* n. sp. is also similar to *Halalaimus americanus* n. sp. (described next) in the length of the outer labial and cephalic sensilla and absence of a a spherical swelling at the tail tip. *H. paracomatus* n. sp. differs from *H. americanus* n. sp. in that the circles of outer labial and cephalic sensilla are closer together (0.67 versus 1.7-2.0 head diameters apart), the amphid is shorter (5.3-8.8 versus 19.3-20.3 head diameters), and the gubernaculum is rectangular without the distinct keel-like extension between the spicules that is present in *H. americanus* n. sp.

Halalaimus americanus n. sp.
Figs. 51-59

Cuticle smooth, faint striations present at posterior end of lateral alae in one specimen. Broad lateral alae present, commencing at posterior end of amphid, fade into ornamented caudal alae in male. Inner labial sensilla not discernible. Outer labial and cephalic sensilla in two well-separated circles, unequal in length; outer labials shorter. Excretory pore not observed. Precloacal sensillum present; precloacal pore absent. Conical part of tail with vermiculations. Cylindrical part of tail with coarse transverse striations. Tail tip blunt; spinneret present. Female unknown.

Males (n = 3): Length 1.45 mm (1.39-1.51). Width at midbody 23.3(22-24). Head diameter 3.1(3.0-3.2) at level of cephalic sensilla. Outer labial sensilla 3.5(3.0-4.4) long; cephalic sensilla 5.5(5.0-6.4) long. Labial surface to amphid 31(26-37) and nerve ring 246.5(235-258). Amphid 56.7(51-61) long. Esophagus 525.3(504-536) long. Tail 174(160-192) long. Width at cloaca 17(16-18). Spicules 26(24-27) long. Gubernaculum 8.5(8.0-9.6) long with narrow keel-like extension between spicules and extension lateral to each spicule; distal end of lateral extension cup-shaped. Cuticle on conical part of tail vermiculated. a = 62.3(60.8-63.2). b = 2.76(2.72-2.80). c = 8.40(7.86-8.69).

Specimens: Holotype male, USNM 77270; paratype males, USNM 77506 & 77507.

Locality: St. Andrew Bay, Bay County, Florida, (85° 39'07"W, 30° 08'29"N) and (85° 39'46"W, 30° 08'40"N). Water 2.0 to 12.2 meters deep.

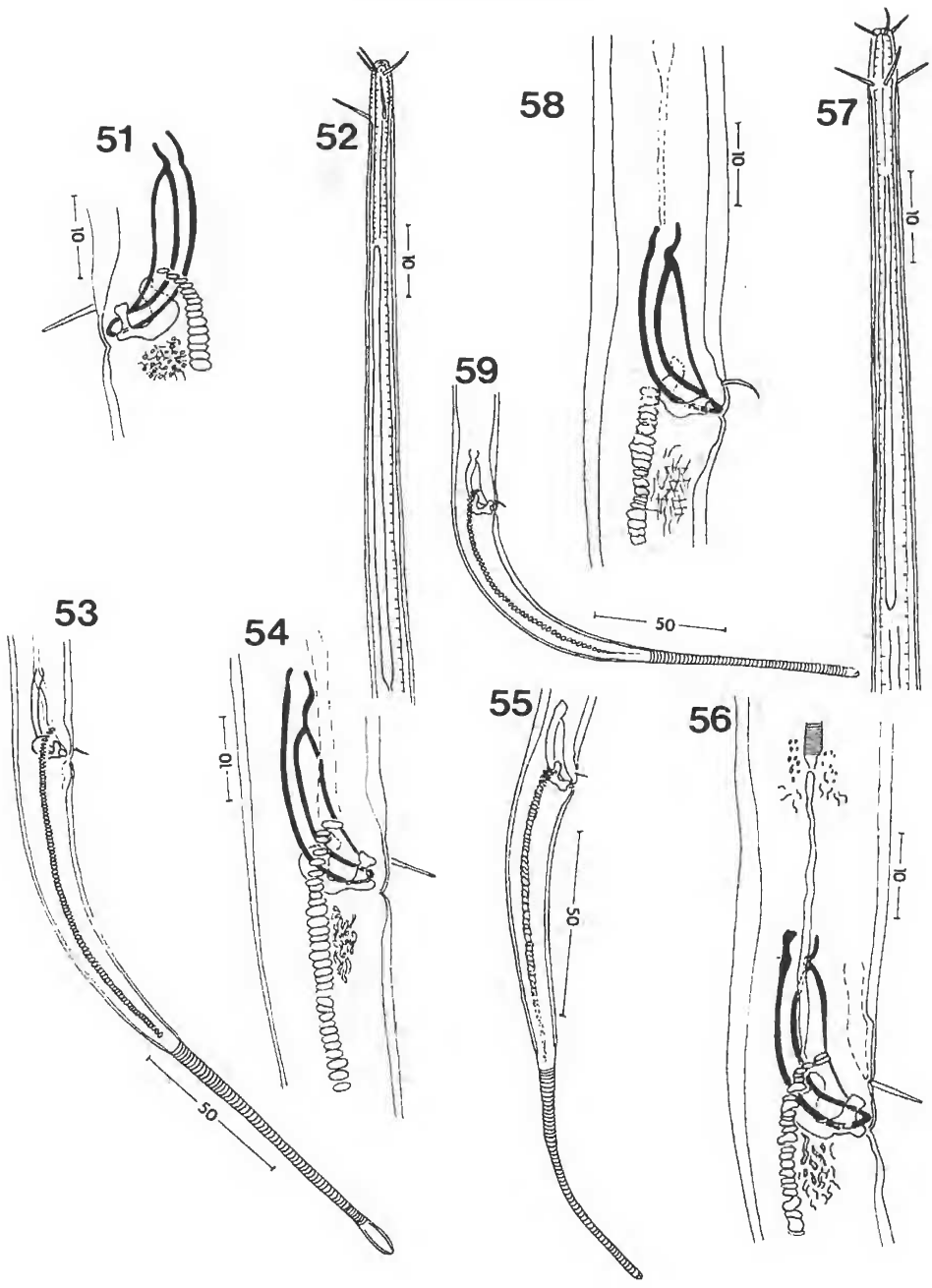
Etymology: Named after geographical location, America.

Remarks: *H. americanus* is similar to *H. paracomatus* n. sp. and differs from that species as discussed in the remarks section for *H. paracomatus* n. sp.

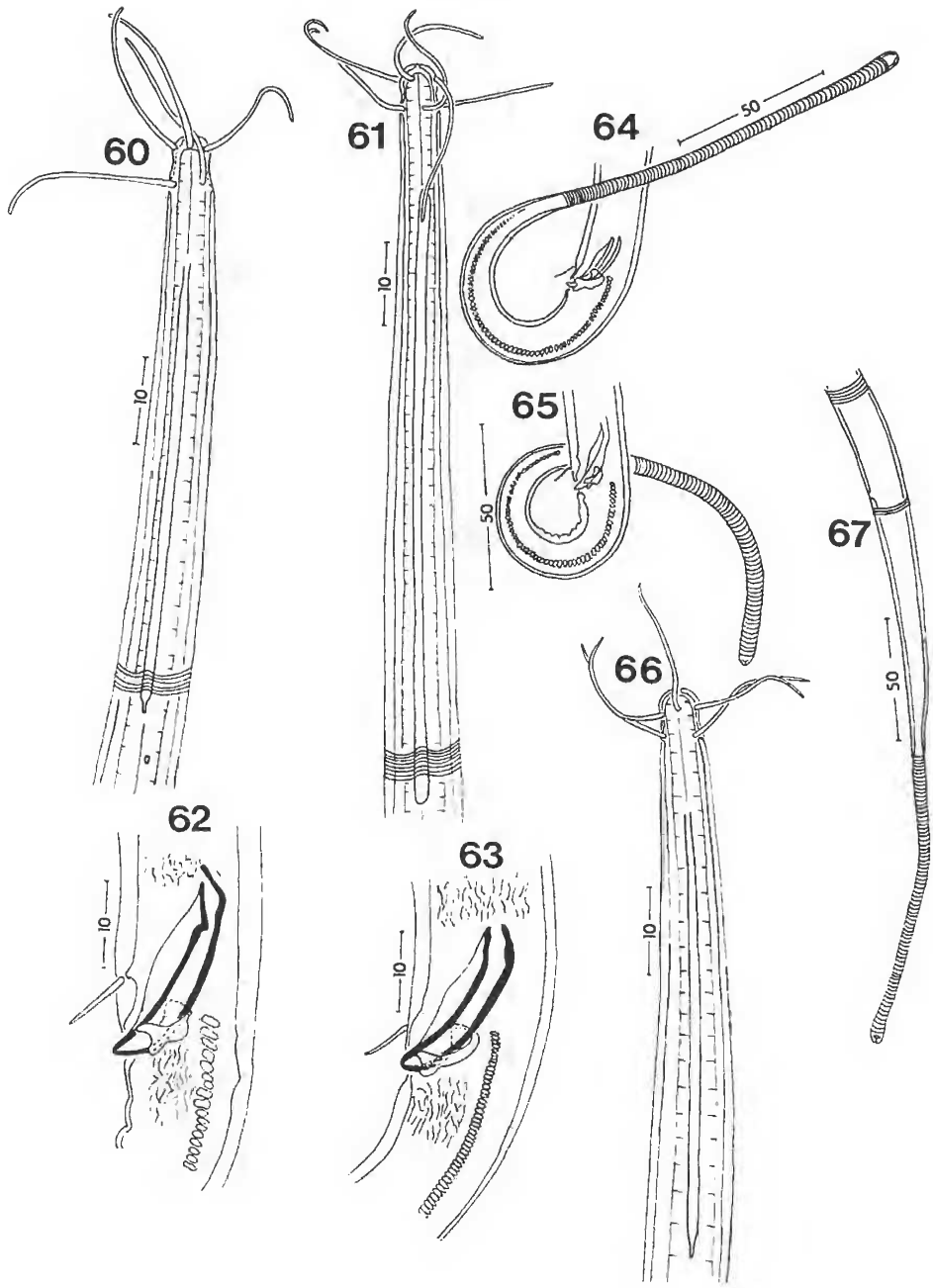
Halalaimus floridanus n. sp.
Figs. 60-67

Cuticle faintly striated, appears punctate from midbody to precloacal region in male and anal region in female; cuticle of lateral fields also faintly vermiculated from midbody to cloacal region in male and anal region in female. Lateral alae not observed; ornamented caudal alae present in male; absent in female. Inner labial sensilla not discernible. Outer labial and cephalic sensilla equal in length. Lateral outer labial sensilla greater in diameter than other sensilla. Excretory pore not observed. Precloacal sensillum present and precloacal pore absent in male. Cuticle of conical part of tail vermiculated in male, not so in female. Cylindrical part of tail with coarse transverse striations. Tail tip blunt; spinneret present.

Males (n = 4): Length 1.53 mm (1.34-1.70). Width at midbody 18.5(16-21). Head diameter 4.4(4.0-4.8) at level of cephalic sensilla. Outer labial and cephalic sensilla 19.8(18-21) long. Labial surface to amphid 15.5(14-19) and nerve ring 202(192-208). Amphid 65.5(55-76) long. Esophagus 314.6(277-359) long. Tail 185.5(176-206) long. Width at cloaca 15(13-17). Spicules 20.8(18-24) long. Gubernaculum 8(8-8) long with small keel-like extension between spicules, and an extension lateral to each spicule tip; distal end of lateral extension cup-shaped. a = 82.7



Figs. 51-59. *Halalaimus americanus* n. sp. Fig. 51. Male, cloacal region, left lateral view. Fig. 52. Male, anterior end, right lateral view. Fig. 53. Male, posterior end, right lateral view. Fig. 54. Male, cloacal region, right lateral view. Fig. 55. Male, posterior end, right lateral view. Fig. 56. Male, cloacal region, right lateral view. Fig. 57. Male, anterior end, right lateral view. Fig. 58. Male, cloacal region, right lateral view. Fig. 59. Male, posterior end, right lateral view. Scale bars in µm.



Figs. 60-67. *Halalaimus floridanus*. n. sp. Fig. 60. Male, anterior end, left lateral view. Fig. 61. Male, anterior end, left lateral view. Fig. 62. Male, cloacal region, left lateral view. Fig. 63. Male, cloacal region, left lateral view. Fig. 64. Male posterior end, left lateral view. Fig. 65. Male, posterior end, left lateral view. Fig. 66. Female, anterior end, left lateral view. Fig. 67. Female, posterior end, left lateral view. Scale bars in µm.

(74.4-89.5). b = 4.86(4.67-5.13). c = 8.22(7.61-9.16).

Female (n = 1): Length 1.58 mm. Width at midbody 27. Head diameter 4.8 at level of cephalic sensilla. Outer labial and cephalic sensilla 16 long. Labial surface to amphid 15 and nerve ring 194. Amphid 54 long. Esophagus 321 long. Width at anus 15. Tail 227 long. Anterior to vulva 884. Reproductive system amphidelphic; reflexed. a = 58.5. b = 4.92. c = 11.4. V = 53%.

Specimens: Male holotype, USNM 77271; male paratypes, USNM 77272-77275; female allotype, USNM 77276.

Locality: Mouth of Freshwater Bayou off St. Andrew Bay, Bay County, Florida (85° 39'00"W, 30° 07'30"N). Water 1.0 meter deep. Two male paratypes from Biscayne Bay, Dade County, Florida provided by Dr. Tarjan.

Etymology: Named for the geographic locality, state of Florida.

Remarks: *Halalaimus floridanus* n. sp. is the only species in group 1 with the following combination of characters: cylindrical part of tail with coarse transverse striations, precloacal sensillum present, precloacal pore absent, and the outer labial and cephalic sensilla are 4.4 head diameters long or longer.

Artificial Key to the Males of Group 1
(HD = head diameter; CD = cloacal diameter)

1. Cervical, somatic, and caudal sensilla present ..... *Halalaimus thalassinus* n. sp.
   Cervical, somatic, and caudal sensilla absent 2

2(1). Precloacal pore present; precloacal sensillum absent 3
   Precloacal pore absent; precloacal sensillum present 4

3(2). Precloacal pore with large glandular structure; outer labial and cephalic sensilla 1.0 HD long .....
   ..... *Halalaimus sobakini* Sergeeva, 1973
   Precloacal pore without large glandular structure; outer labial and cephalic sensilla 3.3 HD long .....
   ..... *Halalaimus variabilis* n. sp.

4(2). Cylindrical part of tail with coarse transverse striations 5
   Cylindrical part of tail without coarse transverse striations 9

5(4). Outer labial and cephalic sensilla equal to or greater than 3.0 HD long 6
   Outer labial and cephalic sensilla less than or equal to 2.0 HD long 7

6(5). Outer labial and cephalic sensilla 3.0 HD long; inner labial sensilla discernible; amphid begins 7.0 HD from anterior end ..... *Halalaimus bayensis* n. sp.
   Outer labial and cephalic sensilla 4.5 HD long; inner labial sensilla not discernible; amphid begins 3.5 HD from anterior end ..... *Halalaimus floridanus* n. sp.

7(5). Outer labial and cephalic sensilla in two well-separated circles, 1.0-1.8 HD apart; outer labial sensilla shorter than cephalic sensilla 8
   Outer labial and cephalic sensilla in two circles close together, 0.43-0.50 HD apart; outer labial and cephalic sensilla equal in length ..... *Halalaimus paracomatus* n. sp.

8(7). Broad lateral somatic alae present; spicules 1.5 CD long; amphid narrow, 17-19 HD long; inner labial sensilla not discernible ..... *Halalaimus americanus* n. sp.
   Broad lateral somatic alae absent; spicules 2.0-2.1 CD long; amphid broad, 7.5-8.6 HD long; inner labial sensilla discernible ..... *Halalaimus tarjani* n. sp.

9(4). Outer labial and cephalic sensilla in two well-separated circles, 1.2 HD apart; inner labial sensilla discernible ..... *Halalaimus bulbocaudatus* n. sp.
   Outer labial and cephalic sensilla in two circles close together, 0.2 HD apart; inner labial sensilla not discernible ..... *Halalaimus comatus* Wieser, 1953

Group 2

Males of the species in this group have caudal alae that are ornamented or unornamented. Precloacal sensillum and precloacal pore absent. Inner labial sensilla discernible in some species. Outer labial and cephalic sensilla of varying length between circles. Circles of sensilla varying distances apart.

Cylindrical part of tail with or without coarse transverse striations. Tail tip blunt, bifurcate, or flagellate.

Halalaimus gracilis De Man, 1888

Halalaimus gracilis has been reported from a number of localities world-wide and various descriptions have been published. De Man (1888) described *H. gracilis* on the basis of a male and a female from the North Sea. A circle of setiform inner labial sensilla is present in addition to the circles of outer labial and cephalic sensilla. The male has ornamented caudal alae, and a setiform precloacal sensillum and pore are absent. The gubernaculum is figured as a narrow plate without an apophysis or lateral extensions. De Man (1922) described additional specimens of *H. gracilis*.

Stekhoven (1935) described specimens of a species of *Halalaimus* as *H. gracilis*, but did not mention or figure the presence of the ornamented caudal alae. In the absence of this information, *H. gracilis* sensu Stekhoven (1935) is considered a species inquirenda. Stekhoven (1935) also placed *Halalaimus droebachiensis* Allgen, 1931 as a synonym of *H. gracilis* sensu Stekhoven (1935). The description given by Allgen (1931) was based on a female specimen and does not mention or figure the inner labial sensilla present in *H. gracilis*. Therefore, this species is also considered to be a species inquirenda.

Bresslau and Stekhoven (1940) described specimens of a species of *Halalaimus* as *H. gracilis* but did not describe or figure the ornamented caudal alae or inner labial sensilla characteristic of *H. gracilis*. These specimens appear similar to those described by Stekhoven (1935) and are, therefore, considered to be a species inquirenda. Stekhoven (1950) described what he considered to be a female of *H. gracilis*. Inner labial sensilla are not described, but the figure indicates that they may be present. In view of the doubt as to the presence or absence of inner labial sensilla, the specimen is considered a species inquirenda.

Timm (1952) described a male specimen of a species of *Halalaimus* that he referred to as *H. gracilis*. However, he did not describe or figure the presence of inner labial sensilla and did not mention or figure the presence or absence of ornamented caudal alae. Timm (1952) did state that the specimen had a smooth cuticle and lateral alae were absent. In view of the absence of information and figures, *H. gracilis* sensu Timm, 1952 is also considered to be a species inquirenda.

Halalaimus gerlachi n. sp.
Synonym: *Halalaimus gracilis* sensu Gerlach, 1967; nec *H. gracilis* De Man, 1888.

Gerlach (1967) described specimens of *Halalaimus* from the Red Sea as *H. gracilis*. Inner labial sensilla are not discernible and lateral alae are present in the specimens. Males have ornamented caudal alae, and the gubernaculum has a caudally directed apophysis. The absence of the inner labial sensilla and the presence of a gubernacular apophysis is sufficient to differentiate the specimens from *H. gracilis* and designate them as a new species, *Halalaimus gerlachi* n. sp. (Gerlach 1967). The holotype of the species is the specimen on which Gerlach (1967) based his description. The only other species of *Halalaimus* with a gubernaculum with an apophysis is *Halalaimus sarsi* Gerlach, 1967. *H. gerlachi* n. sp. differs from *H. sarsi* in the presence of ornamented caudal alae and shorter outer labial and cephalic sensilla (1.5 versus 2.0 head diameters long).

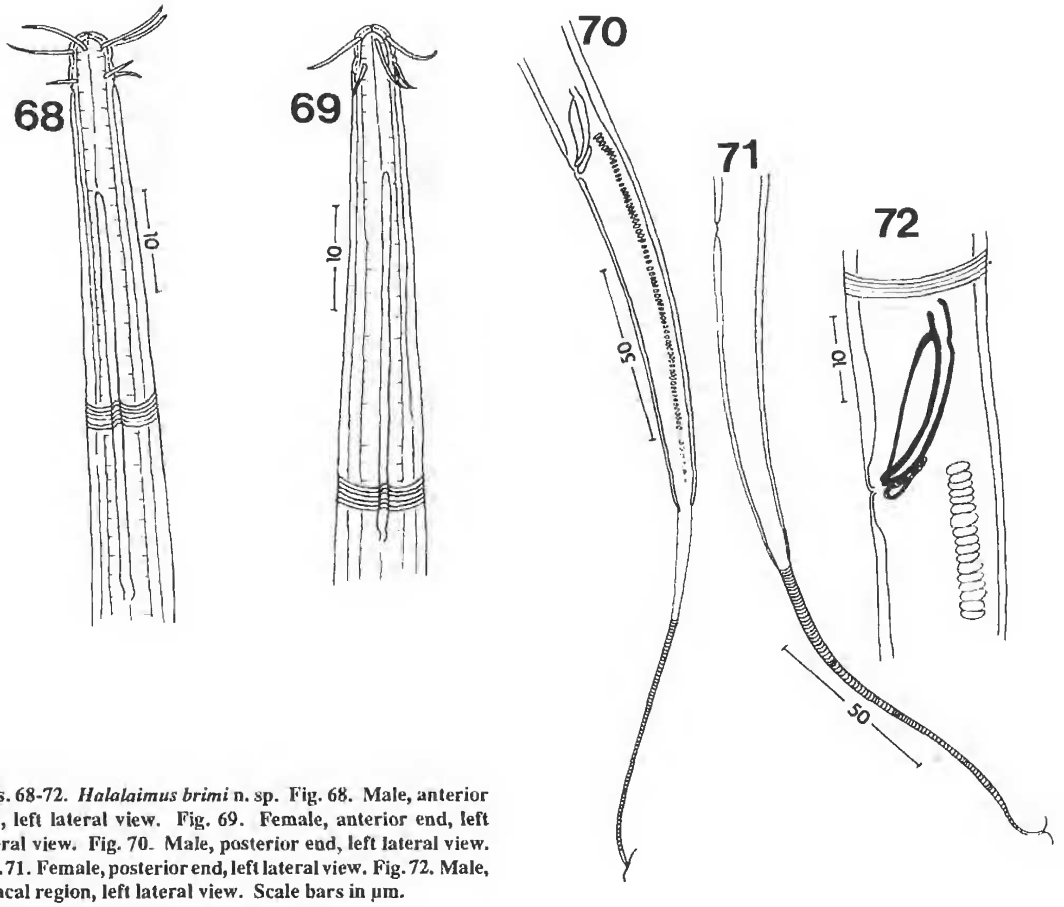
Platt and Warwick (1983) described specimens of *Halalaimus* as *H. gracilis*. The inner labial sensilla are not mentioned or figured, caudal alae are absent in the male, and a precloacal sensillum is present. Based on the description, these specimens cannot be *H. gracilis*. They belong in group 3 below along with those species in which a precloacal sensillum is present and caudal alae are absent.

Halalaimus brimi n. sp.
Figs. 68-72

Cuticle with transverse striations. Lateral alae not observed. Ornamented caudal alae present in male; caudal alae absent in female. Inner labial sensilla not discernible. Outer labial sensilla longer than cephalic sensilla; circles far apart. Excretory pore not observed. Precloacal sensillum and pore absent. Conical part of tail without vermiculations; cylindrical part of tail with coarse transverse striations. Tail tip bifurcate.

Male (n = 1): Length 1.27 mm. Width at midbody 22. Head diameter 4.7 at level of cephalic sensilla. Outer labial sensilla 7.0 long. Cephalic sensilla 3.3 long. Labial surface to amphid 16 and nerve ring 203. Amphid 41 long. Esophagus 328 long. Width at cloaca 16. Tail 192 long. Spicules 23 long. Gubernaculum 6.8 long, expanded distally, narrowed proximally. a = 57.7. b = 3.87. c = 6.61.

Female (n = 2): Length 1.31 mm (1.30-1.32). Width at midbody 26(25-27). Head diameter 4.6(4.5-4.7) at level of cephalic sensilla. Outer labial sensilla 6.3(6.3-6.3) long. Cephalic sensilla 3.3(3.3-3.3) long. Labial surface to amphid 14.5(14-15) and nerve ring 198(191-205). Amphid 36(35-37) long. Esophagus 360(359-361) long. Width at



Figs. 68-72. ***Halalaimus brimi*** **n. sp. Fig. 68. Male, anterior end, left lateral view. Fig. 69. Female, anterior end, left lateral view. Fig. 70. Male, posterior end, left lateral view. Fig. 71. Female, posterior end, left lateral view. Fig. 72. Male, cloacal region, left lateral view. Scale bars in µm.**

anus 14(14-14). Tail 198(196-200) long. Vulva 681(674-688) from anterior end. Reproductive system amphidelphic; reflexed. a = 50.3(48.1-52.4). b = 3.63(3.62-3.64). c = 6.58(6.50-6.65). V = 52.5%(52-53).

Specimens: Male, holotype, USNM 77277; female allotype, USNM 77278; female paratype, USNM 77509.

Locality: St. Andrew Bay, Bay County, Florida (85° 38'52"W, 30° 07'38"N). Water 8.0 meters deep.

Etymology: Named for Mr. Michael Brim of the United States Fish and Wildlife Service, Panama City, Florida without whose support many of the specimens included in this study would not have been obtained.

Remarks: *Halalaimus brimi* n. sp. is the only species in this group with a bifurcate tail tip and with outer labial sensilla longer than cephalic sensilla. *H. brimi* n. sp. is similar to *Halalaimus diacros* Mawson, 1958 in the presence of a bifurcate tail. *H. brimi* n. sp. differs from *H. diacros* in the presence of ornamented caudal alae and the presence of outer labial sensilla that are longer than the cephalic sensilla. *H. brimi* n. sp. is also similar to *Halalaimus horridus* Gerlach, 1956 in that the outer labial sensilla are longer than the cephalic sensilla. *H. brimi* n. sp. differs from *H. horridus* in the shorter length of the labial and cephalic sensilla (1.3-1.5 and 0.7 versus 3.0 and 1.0 head diameters long), in the presence of a bifurcate tail tip, and in the presence of coarse transverse striations on the cylindrical part of the tail.

Artificial Key to the Males of Group 2
(HD = head diameter; CD = cloacal diameter)

1. Caudal alae unornamented 2
   Caudal alae ornamented 7

2(1). Inner labial sensilla discernible . . . . . *Halalaimus alatus* Timm, 1952
   Inner labial sensilla not discernible 3

3(2). Tail flagellate 30-42 CD long 4
   Tail not flagellate 8-16 CD long 5

4(3). Tail 30 CD long; outer labial and cephalic sensilla 1.7 HD long, in two circles 0.2 HD apart . . . . . *Halalaimus relatus* Gerlach, 1967
   Tail 42 CD long; outer labial and cephalic sensilla 1.2 HD long, in two circles 1.0 HD apart . . . . . *Halalaimus filum* Gerlach, 1962

5(3). Gubernaculum with dorso-caudally directed apophysis . . . . . *Halalaimus sarsi* Gerlach, 1967
   Gubernaculum without dorso-caudally directed apophysis 6

6(5). Outer labial sensilla papilliform; cephalic sensilla 0.33 HD long; "a" = 58.5 . . . . . *Halalaimus lineatoides* Timm, 1961
   Outer labial and cephalic sensilla setiform, 1.0 HD long; "a" = 100.0 . . . . . *Halalaimus lineatus* Timm, 1961

7(1). Tail tip bifurcate . . . . . *Halalaimus brimi* n. sp.
   Tail tip not bifurcate 8

8(7). Gubernaculum with dorso-caudally directed apophysis; inner labial sensilla not discernible . . . . . *Halalaimus gerlachi* n. sp.
   Gubernaculum without dorso-caudally directed apophysis; inner labial sensilla discernible . . . . . *Halalaimus gracilis* De Man, 1888

Group 3

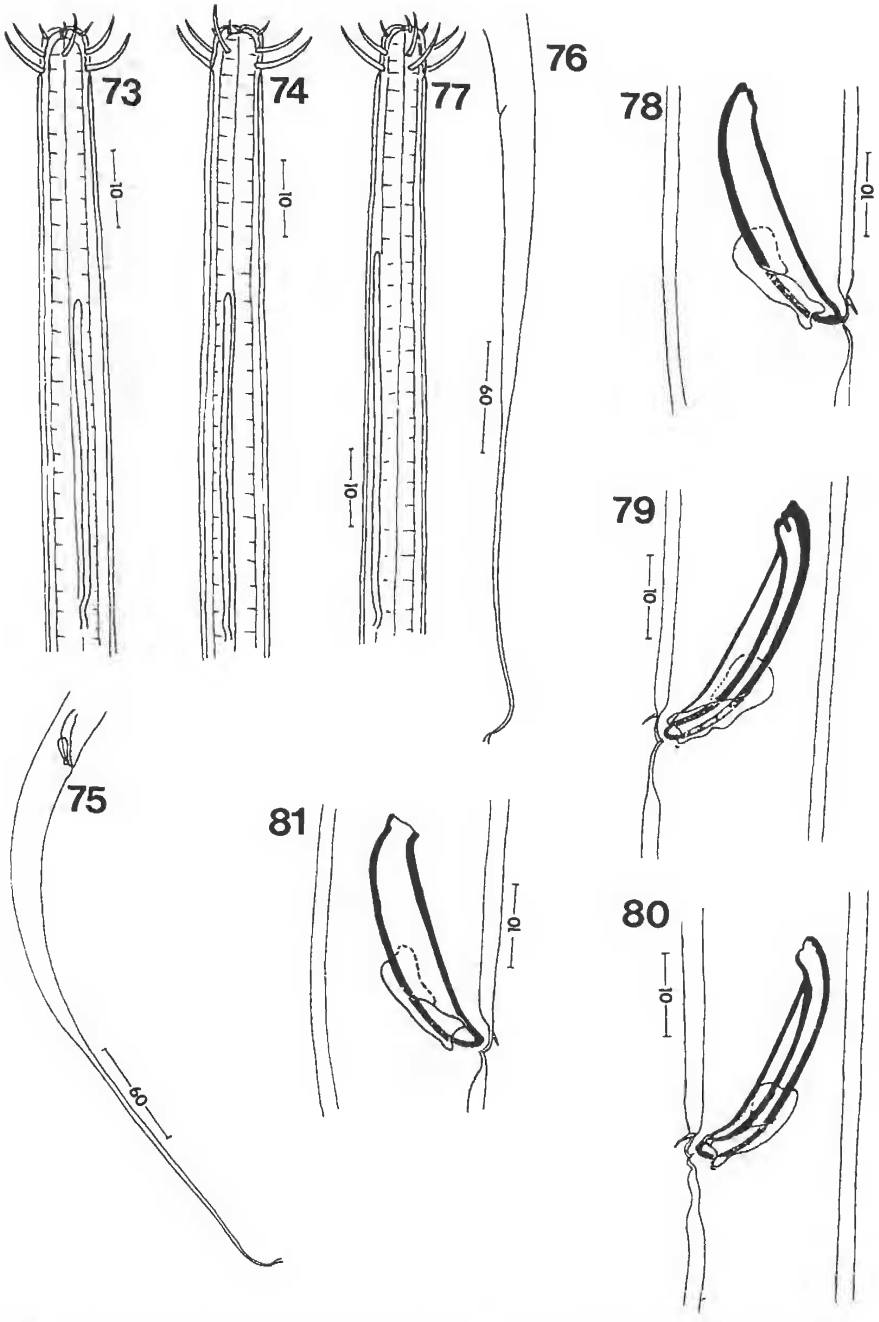
Males without caudal alae. Precloacal sensillum and/or precloacal pore present. Inner labial sensilla discernible in some species, not so in others. Outer labial and cephalic sensilla can vary in length between circles. Circles of varying distances apart. Cylindrical part of tail with or without coarse transverse striations. Tail tip blunt, bifurcate, or flagellate.

Halalaimus parafletcheri n. sp.
Figs. 73-81

Cuticle smooth. Lateral and caudal alae not observed. Inner labial sensilla setiform. Outer labial sensilla shorter than cephalic sensilla. Excretory pore not observed. Small precloacal sensillum present, precloacal pore absent in males. Conical part of tail without vermiculations; cylindrical part of tail without coarse transverse striations. Tail tip bifurcate.

Males (n = 3): Length 2.29 mm (2.17-2.44). Width at midbody 34(32-35). Head diameter 6.4(6.4-6.4) at level of cephalic sensilla. Inner labial sensilla 2.6(2.4-3.0) long. Outer labial sensilla 6.1(5.6-6.4) long. Cephalic sensilla 7.7(7.2-8.0) long. Labial surface to amphid 35.3(34-37) and nerve ring 449(432-459). Amphid 42.3(40-45) long. Esophagus 628(605-649) long. Width at cloaca 21.7(21-22). Tail 320(304-336) long. Spicules 32(32-32) long; right spicule broader than left. Gubernaculum 16(16-16) long with keel-like extension between spicules and extensions lateral to spicule, distal end of each lateral extension cup-shaped. a = 67.5(62.0-70.9). b = 3.65(3.59-3.76). c = 7.18(6.76-7.63).

Females (n = 2): Length 2.53 mm (2.27-2.78). Width at midbody 45.5(43-48). Head diameter 6.4(6.4-6.4) at



Figs. 73-81. *Halalaimus parafletcheri* n. sp. Fig. 73. Male, anterior end, right lateral view. Fig. 74. Male, anterior end, left lateral view. Fig. 75. Male, posterior end, right lateral view. Fig. 76. Female, posterior end, left lateral view. Fig. 77. Female, anterior end, left lateral view. Fig. 78. Male, cloacal region, right lateral view. Fig. 79. Male, cloacal region, left lateral view. Fig. 80. Male, cloacal region, right lateral view. Fig. 81. Male, cloacal region, left lateral view. Scale bars in μm.

level of cephalic sensilla. Inner labial sensilla 2.0(2.0-2.0) long. Outer labial sensilla 6.4(6.4-6.4) long. Cephalic sensilla 8.0(8.0-8.0) long. Labial surface to amphid 31(30-32) and nerve ring 472(432-512). Amphid 33.5(32-35) long. Esophagus 680(617-743) long. Width at anus 18(18-18). Tail 321.5(307-336) long. Anterior to vulva 1.40 mm (1.20-1.59). Reproductive system amphidelphic; reflexed. a = 55.4(52.8-57.9). b = 3.71(3.68-3.74). c = 7.83(7.39-8.27). V = 55%(53-57).

Specimens: Holotype male, USNM 77204; paratype males, USNM 77206 & 77207; allotype female, USNM 77205; paratype female, USNM 77208.

Locality: Holotype male, allotype female from Freshwater Bayou off St. Andrew Bay, Bay County, Florida (85° 39'00"W, 30° 07'33"N), water 1.0 and 2.0 meters deep. Paratypes from St. Andrew Bay, Bay County, Florida at the National Marine Fisheries Service Laboratory (85° 42'43"W, 30° 08'33"N), water 0.3 meter deep.

Remarks: *Halalaimus parafletcheri* n. sp. is the only species in Group 3 with a bifurcate tail tip. *H. parafletcheri* n. sp. is similar to *Halalaimus fletcheri* Mawson, 1958 (Group 4) in the presence of the bifurcate tail tip, absence of cuticular striations, absence of lateral and caudal alae, and the presence of setiform inner labial sensilla. *H. parafletcheri* n. sp. differs from *H. fletcheri* in that the males have a precloacal sensillum, the spicules are unequal in width, and the circle of outer labial and cephalic sensilla are closer together (2 µm versus 4 µm apart). *H. parafletcheri* n. sp. is also similar to *Halalaimus filicollis* Timm, 1961 (Group 4) in the presence of a bifurcate tail tip. *H. parafletcheri* n. sp. differs from that species in that the males have a precloacal sensillum, cuticular striations are absent, and the spicules are unequal in width.

Artificial Key to the Males of Group 3
(HD = head diameter; CD = cloacal diameter)

1.	Tail tip bifurcate	*Halalaimus parafletcheri* n. sp.
	Tail tip not bifurcate	2
2(1).	Cylindrical part of tail with coarse transverse striations	3
	Cylindrical part of tail without coarse transverse striations	4
3(2).	Tail 106 CD long; "a" = 187.0	*Halalaimus monstrocaudatus* Vitiello, 1970
	Tail 9.0-9.2 CD long; "a" = 58.9-60.6	*Halalaimus curvicaudatus* Juario, 1974
4(2).	Cuticle with transverse striations	5
	Cuticle without transverse striations	7
5(4).	Outer labial sensilla shorter (0.5-0.6 HD long) than cephalic sensilla (11-12 HD long); short cervical and caudal sensilla present	*Halalaimus delamarei* Vitiello, 1970
	Outer labial sensilla longer than cephalic sensilla; cervical and caudal sensilla absent	6
6(5).	Outer labial sensilla three times length of cephalic sensilla; tail 9.0 CD long	*Halalaimus horridus* Gerlach, 1956
	Outer labial sensilla 1.25 times length of cephalic sensilla; tail 14 CD long	*Halalaimus striatus* Gerlach, 1956
7(4).	Precloacal sensillum present, pore absent	8
	Precloacal sensillum absent, pore present	*Halalaimus cubanus* Andrassy, 1973
8(7).	Gubernaculum with apophysis	*Halalaimus minusculus* Tchesunov, 1978
	Gubernaculum without apophysis	9
9(8).	Outer labial and cephalic sensilla less than 1.0 HD long	*Halalaimus terrestris* Gerlach, 1959
	Outer labial and cephalic sensilla 1.5 HD or greater in length	10
10(9).	Outer labial and cephalic sensilla equal in length	11
	Outer labial sensilla shorter than cephalic sensilla	*Halalaimus marri* Mawson, 1958
11(10).	"a" = 223; outer labial and cephalic sensilla 2.4-3.4 HD long; amphid 18.3 HD long	*Halalaimus cirrhatus* Gerlach, 1953
	"a" = 84.4-118.7; outer labial and cephalic sensilla 1.4 HD long; amphid 9-10 HD long	*Halalaimus nigrilapidarius* Boucher, 1977

Group 4

Males without caudal alae. Precloacal sensillum and precloacal pore absent. Inner labial sensilla discernible in some species, in other species not so. Outer labial and cephalic sensilla can vary in length between circles. Circles varying distances apart. Cylindrical part of tail with or without coarse transverse striations. Tail tip blunt, bifurcate or flagellate. Single specimens of *Halalaimus* species belonging to this group were examined but are not included in the following key or described.

Artificial Key to the Males of Group 4
(HD = head diameter; CD = cloacal diameter)

1. Outer labial and cephalic sensilla in two circles of 6 and 6 2
   Outer labial and cephalic sensilla in two circles of 6 and 4 3

2(1). Tail tip bifurcate . . . . . *Halalaimus filicollis* Timm, 1961
   Tail tip not bifurcate . . . . . *Halalaimus setosus* Timm, 1961

3(1). Cuticle with coarse longitudinal striations . . . . . *Halalaimus longistriatus* Timm, 1961
   Cuticle without coarse longitudinal striations 4

4(3). Tail tip bifurcate 5
   Tail tip not bifurcate 6

5(4). Cylindrical part of tail with coarse transverse striations . . . . . *Halalaimus diacros* Mawson, 1958
   Cylindrical part of tail without coarse transverse striations . . . . . *Halalaimus fletcheri* Mawson, 1958

6(4). Cylindrical part of tail with coarse transverse striations 7
   Cylindrical part of tail without coarse transverse striations 9

7(6). Amphid width 23-36% of corresponding body diameter . . . . . *Halalaimus pachydoroides* Vitiello, 1970
   Amphid width 10-16% of corresponding body diameter 8

8(7). Gubernaculum present . . . . . *Halalaimus filicorpus* Vitiello, 1970
   Gubernaculum absent . . . . . *Halalaimus turbidus* Vitiello, 1970

9(6). Cephalic sensilla equal to or greater than 4.0 HD long 10
   Cephalic sensilla less than or equal to 2.2 HD long 13

10(9). Tail 44.6 CD long . . . . . *Halalaimus meyersi* Wieser & Hopper, 1967
   Tail equal to or less than 20.4 CD long 11

11(10). Outer labial sensilla shorter (2.1 HD long) than cephalic sensilla (4.0 HD long) . . . . . *Halalaimus florescens* Gerlach, 1967
   Outer labial and cephalic sensilla equal, 4.0-6.0 HD long 12

12(11). Circles of outer labial and cephalic sensilla well-separated (2.2-2.6 HD apart); gubernaculum without ventral curve . . . . . *Halalaimus supercirrhatus* Gerlach, 1955
   Circles of outer labial and cephalic sensilla closer together (1.0 HD apart); gubernaculum with ventral curve . . . . . *Halalaimus capitulatus* Boucher, 1977

13(9). Inner labial sensilla discernible . . . . . *Halalaimus papillifer* Gerlach, 1956
   Inner labial sensilla not discernible 14

14(13). Cuticle with transverse striations 15
Cuticle without transverse striations 18

15(14). Tail filiform, 17.7-24.5 CD long, tip pointed 16
Tail not filiform, 8.3-15.0 CD long, tip pointed or blunt 17

16(15). Amphid 23 HD long; circles of outer labial and cephalic sensilla close together (0.33 HD apart) . . . . . *Halalaimus lutarus* Vitiello, 1970
Amphid 8.6 HD long; circles of outer labial and cephalic sensilla far apart (1.0 HD apart) . . . . . *Halalaimus longicollis* Allgén, 1932

17(15). Tail 8.3 CD long, tip pointed . . . . . *Halalaimus macquariensis* Mawson, 1958
Tail 10.5-15.0 CD long, tip blunt . . . . . *Halalaimus longicaudatus* Filipjev, 1927

18(14). Gubernaculum absent or rudimentary 19
Gubernaculum present, well developed 20

19(18). Gubernaculum absent . . . . . *Halalaimus rectispiculatus* Platonova, 1971
Gubernaculum rudimentary, a small plate at distal end of spicules . . . . . *Halalaimus leptoderma* Platonova, 1971

20(18). "a" = 217.7 . . . . . *Halalaimus leptosoma* Southern, 1914
"a" = 130.0 or less 21

21(20). Tail tip pointed 22
Tail tip blunt 23

22(21). Outer labial and cephalic sensilla 1.7 HD long, in two circles close together . . . . . *Halalaimus anne* Sergeeva, 1972
Outer labial and cephalic sensilla 0.2 HD long, in two well-separated circles . . . . . *Halalaimus ciliocaudatus* Allgén, 1932

23(21). Cylindrical part of tail 12% of total tail length . . . . . *Halalaimus pachyderma* Filipjev, 1927
Cylindrical part of tail 25% or more of total tail length 24

24(23). Outer labial and cephalic sensilla less than 1.0 HD long 25
Outer labial and cephalic sensilla greater than 1.0 HD long 26

25(24). Circles of outer labial and cephalic sensilla 1.7 HD apart; amphid 8.6 HD from anterior end; distal end of gubernaculum expanded laterally . . . . . *Halalaimus zenkevitshi* Filipjev, 1927
Circles of outer labial and cephalic sensilla 0.78 HD apart; amphid 2.2-4.6 HD from anterior end; distal end of gubernaculum not expanded laterally . . . . . *Halalaimus isaitshikovi* Filipjev, 1927

26(24). Circles of outer labial and cephalic sensilla 1.0 HD apart . . . . . *Halalaimus parvus* Chitwood, 1936
Circles of outer labial and cephalic sensilla 0.5 HD or less apart 27

27(26). "c" = 15.9 . . . . . *Halalaimus brevispiculum* Sergeeva, 1973
"c" = 9.0 or less 28

28(27). Amphid 5.6 HD from anterior end, 9.2 HD long . . . . . *Halalaimus wodjanizkii* Sergeeva, 1972
Amphid 3.0-3.2 HD from anterior end, 6.0-12.0 HD long 29

29(28). Amphid 6.0 HD long; gubernaculum without lateral extensions . . . . . *Halalaimus caroliniensis* Chitwood, 1936
Amphid 12.0 HD long; gubernaculum with lateral extensions . . . . . *Halalaimus jaltensis* Sergeeva, 1973

The construction of a key to the females of the species of *Halalaimus* is more difficult than for males. Characters are not as distinct and many descriptions are not sufficiently complete to separate individual species. The following key ends with groups of similar species that could not be easily separated. Females are not known for a number of species. The following species were not included due to the absence of necessary information; *Halalaimus leptoderma* Platonova, 1971 and *Halalaimus leptosoma* Southern, 1914.

Artificial Key to the Females of the Genus *Halalaimus*
(HD = head diameter, AD = anal diameter)

1. Outer labial and cephalic sensilla in two circles of 6 + 6 2
   Outer labial and cephalic sensilla in two circles of 6 + 4 3

2(1). Tail tip bifurcate . . . . . *Halalaimus filicollis* Timm, 1961
   Tail tip not bifurcate . . . . . *Halalaimus setosus* Timm, 1961

3(1). Cuticle with coarse longitudinal striations . . . . . *Halalaimus longistriatus* Timm, 1961
   Cuticle without coarse longitudinal striations 4

4(3). Tail tip bifurcate 5
   Tail tip not bifurcate 8

5(4). Cylindrical part of tail with coarse striations 6
   Cylindrical part of tail without coarse striations 7

6(5). Outer labial sensilla twice length of cephalic sensilla . . . . . *Halalaimus brimi* n. sp.
   Outer labial and cephalic sensilla equal . . . . . *Halalaimus diacros* Mawson, 1958

7(5). Circles of outer labial and cephalic sensilla well-separated (0.73-0.83 HD apart) . . . . . *Halalaimus fletcheri* Mawson, 1958
   Circles of outer labial and cephalic sensilla close together (0.30-0.38 HD apart) . . . . . *Halalaimus parafletcheri* n. sp.

8(4). Cervical and caudal sensilla present 9
   Cervical and caudal sensilla absent 10

9(8). Lateral alae present; outer labial and cephalic sensilla equal; inner labial sensilla papilliform . . . . . *Halalaimus thalassinus* n. sp.
   Lateral alae absent; outer labial sensilla shorter than cephalic sensilla; inner labial sensilla not discernible . . . . . *Halalaimus delamarei* Vitiello, 1970

10(8). Tail tip a spherical bulb 11
   Tail tip not a bulb 13

11(10). Circles of outer labial and cephalic sensilla well-separated (1.0 HD apart); inner labial sensilla papilliform . . . . . *Halalaimus bulbocaudatus* n. sp.
   Circles of outer labial and cephalic sensilla well-separated or not; inner labial sensilla not discernible 12

12(11). Circles of outer labial and cephalic sensilla well-separated (greater than 1.0 HD apart) . . . . . *Halalaimus similis* Allgén, 1930
   Circles of outer labial and cephalic sensilla close together (0.14 HD apart) . . . . . *Halalaimus comatus* Wieser, 1953

13(10). Cylindrical part of tail with coarse transverse striations 14
Cylindrical part of tail without coarse transverse striations 21

14(13). Outer labial and cephalic sensilla equal to or greater than 3.0 HD long 15
Outer labial and cephalic sensilla less than or equal to 2.0 HD long 18

15(14). Outer labial sensilla 5.0 HD long; cephalic sensilla 3.0 HD long .....
..... *Halalaimus longisetosus* Hopper, 1963
Outer labial and cephalic sensilla equal in length and less than 3.5 HD long 16

16(15). Inner labial sensilla discernible ..... *Halalaimus bayensis* n. sp.
Inner labial sensilla not discernible 17

17(16). Lateral outer labial sensilla greater in diameter than other sensilla ..... *Halalaimus floridanus* n. sp.
Lateral outer labial sensilla equal in diameter to other sensilla ..... *Halalaimus variabilis* n. sp.

18(14). Inner labial sensilla discernible 19
Inner labial sensilla not discernible 20

19(18). Outer labial sensilla shorter than cephalic sensilla, in two well-separated circles (1.0 HD apart) .....
..... *Halalaimus tarjani* n. sp.
Outer labial and cephalic sensilla equal in length and in two circles close together (0.29 HD apart) ...
..... *Halalaimus paracomatus* n. sp.

20(18). Amphid broad, 23-33% of corresponding body diameter; tail tip flagellate .....
..... *Halalaimus pachydoroides* Vitiello, 1970
Amphid narrower, 20% or less of corresponding body diameter; tail tip not flagellate .....
..... *Halalaimus turbidus* Vitiello, 1970

21(13). Freshwater or inland species 22
Marine or estuarine species 23

22(21). Body length 0.73-0.91 mm; c = 12.5-17.1 ..... *Halalaimus algeriensis* Coomans and Jacobs, 1983
Body length 1.41-1.47 mm; c = 6.4-7.3 ..... *Halalaimus stammeri* Schneider, 1940

23(21). Amphid broad, about 40% of body diameter at midlength of amphid 24
Amphid narrow, 25% or less of body diameter at midlength of amphid 25

24(23). Anterior end of amphid at level of cephalic sensilla ..... *Halalaimus climactericus* Wieser, 1953
Anterior end of amphid far posterior to cephalic sensilla ..... *Halalaimus ponticus* Filipjev, 1922

25(23). Inner labial sensilla discernible 26
Inner labial sensilla not discernible 28

26(25). Outer labial sensilla shorter (0.25-0.33 HD long) than cephalic sensilla (1.0 HD long) .....
..... *Halalaimus alatus* Timm, 1952
Outer labial and cephalic sensilla equal in length 27

27(26). Outer labial and cephalic sensilla in two well-separated circles (1.0 HD apart) .....
..... *Halalaimus gracilis* De Man, 1888
Outer labial and cephalic sensilla in two circles close together (0.25 HD apart) .....
..... *Halalaimus papillifer* Gerlach, 1956

28(25). Outer labial sensilla 4.7 times as long as cephalic sensilla ..... *Halalaimus horridus* Gerlach, 1956
Outer labial and cephalic sensilla equal or subequal in length 29

29(28). Outer labial and cephalic sensilla equal to or more than 2.0 HD long 30
Outer labial and cephalic sensilla equal to or less than 1.5 HD long 31

30(29). Outer labial and cephalic sensilla in two well-separated circles (1.0 HD or more apart) .....
..... *Halalaimus capitulatus* Boucher, 1977
..... *Halalaimus cirrhatus* Gerlach, 1953
..... *Halalaimus nigrilapidarius* Boucher, 1977
..... *Halalaimus sarsi* Gerlach, 1967
..... *Halalaimus scleratus* Timm, 1952
..... *Halalaimus supercirratus* Gerlach, 1955
Outer labial and cephalic sensilla in two circles close together (less than 1.0 HD apart) .....
..... *Halalaimus marri* Mawson, 1958
..... *Halalaimus monstrocaudatus* Vitiello, 1970

31(29). Outer labial and cephalic sensilla in two well-separated circles (1.0 HD or more apart) 32
Outer labial and cephalic sensilla in two circles close together (less than 1.0 HD apart) 33

32(31). Outer labial sensilla less than 1.0 HD long ..... *Halalaimus brachyaulax* Mawson, 1958
..... *Halalaimus diplocephalus* Filipjev, 1927
..... *Halalaimus isaitshikovi* Filipjev, 1927
..... *Halalaimus minusculus* Tchesunov, 1978
..... *Halalaimus tenuicapitatus* Filipjev, 1946
Outer labial sensilla equal to or greater than 1.0 HD long ..... *Halalaimus amphidellus* Vitiello, 1970
..... *Halalaimus gerlachi* n. sp.
..... *Halalaimus parvus* Chitwood, 1936
..... *Halalaimus zenkevitshi* Filipjev, 1927

33(31). Outer labial sensilla less than 1.0 HD long ..... *Halalaimus terrestris* Gerlach, 1959
..... *Halalaimus wodjaneskii* Sergeeva, 1972
Outer labial and cephalic sensilla equal to or greater than 1.0 HD long .....
..... *Halalaimus amphistrius* Vitiello, 1970
..... *Halalaimus caroliniensis* Chitwood, 1936
..... *Halalaimus longicaudatus* Filipjev, 1927
..... *Halalaimus longicollis* Allgén, 1932
..... *Halalaimus luticolus* Timm, 1961
..... *Halalaimus pachydermatus* Cobb, 1920
..... *Halalaimus rectispiculatus* Platonova, 1971

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